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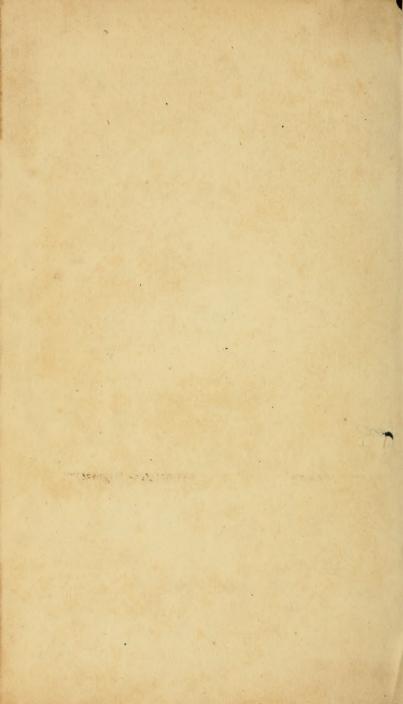
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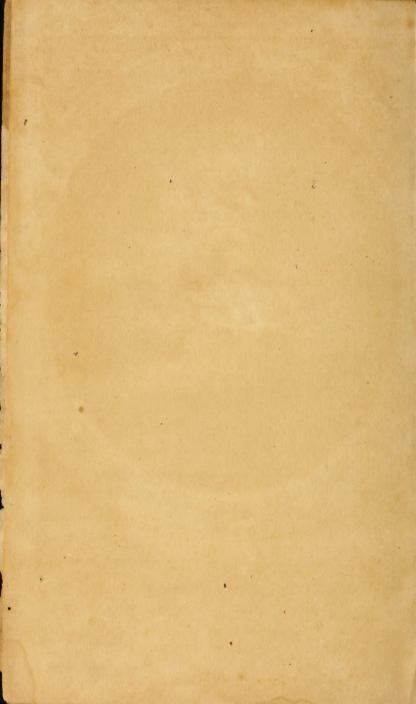
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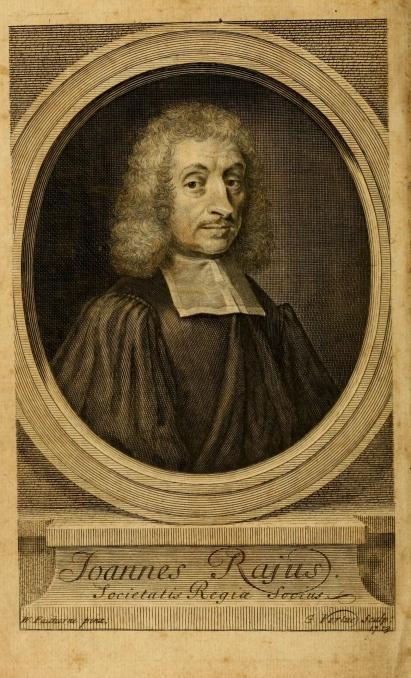




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### Three Physico-Theological

# DISCOURSES,

CONCERNING

I. The Primitive CHAOS, and Creation of the World.

II. The General D E L U G E, its Causes and Effects.

III. The Diffolution of the WORLD, and Future Conflagration.

Wherein are largely discussed,

The Production and Use of Mountains; the Original of Fountains, of Formed Stones, and Sea-Fishes Bones and Shells found in the Earth; the Effects of particular Floods, and Inundations of the Sea; the Eruptions of Vulcano's; the Nature and Causes of Earthquakes.

Also an Historical Account of those Two late remarkable Ones in Jamaica and England.

With PRACTICAL INFERENCES.

# By JOHN'RAT, late Fellow of the Royal Society.

The Third Edition, Illustrated with Copper-Plates, and much more Enlarged than the former Editions, from the Author's own MSS.

London: Printed for WILLIAM INNYS, at the Prince's Arms in S. Paul's Church yard, 1713.





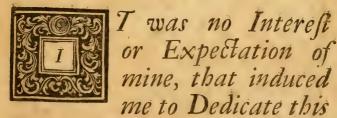
#### TO THE

Most Reverend FATHER in GOD,

# JOHN,

Lord Arch-Bishop of Canterbury, Primate of all England, and Metropoli tan.

### MY LORD,



Discourse to Your Grace. I am not so well conceited of A 2 my

my own Performances, as to think it merits to be inscribed to so Great a Name, much less that I should Oblige Your Lordship, or indeed a far meaner Person, by such Inscription. My principal Motive was, that it would give me Opportunity of Congratulating with the Sober Part of this Nation, Your Advancement to the Archiepiscopal Dignity; and of acknowledging His Majesty's Wisdom in making Choice of so fit a Person to fill that Chair, endued with all Qualifications requisite for so high a Calling; so able and skilful a Pilot to govern the Church,

Church, and so prudent and faithful a Counsellor to serve Himself. But I will not enlarge in just Praises, lest I Should incurr the unjust Cenfure or Suspicion of Flattery. Give me leave only to add, what I may without Injury of Truth, and I think without Violation of Modesty, that Your Grace's Election bath the concurrent Approbation and Applause of all good Men that know You, or have had a true Character of You; which may serve to strengthen Your Hands in the Management and Administration of so difficult a Province, tho You need no fuch Support, A 3 as

as being sufficiently involved and armed by Your Vertues, and protected by the Almighty Power and Providence. Those that are Good and Wise are pleased and satisfied when Great Men are preferred to Great Places; and think it Pity that Persons of large and publick Spirits should be confined to narrow Spheres of Action, and want Field to exercise and employ those rich Talents and Abilities wherewith they are endowed, in doing all the Good they are thereby qualified and inclined to do.

My Lord,

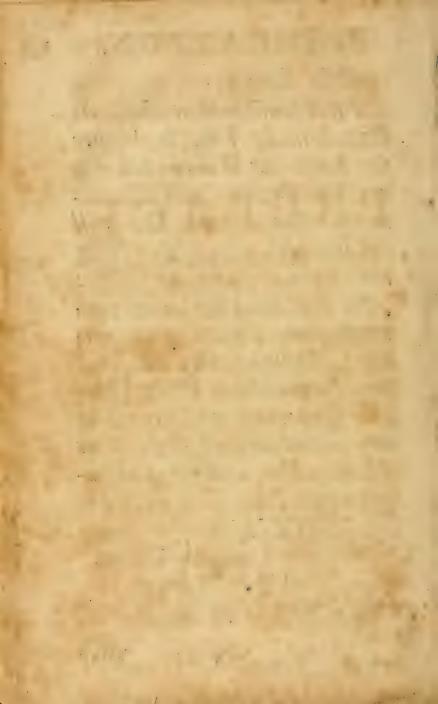
I am sensible that the Prefent I make You, is neither for Bulk nor Worth suitable to Your Person and Greatness; Tet I hope You will favourably accept it, being the best I have to offer: And my Boldness may pretend some Excuse from ancient Acquaintance, and from my Forwardness to embrace this Opportunity of professing my Name among those that Honour You, and of publishing myself,

My Lord; Your Grace's most devoted Servant; and humble Orator,

JOHN RAT.

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THE





#### THE

# PREFACE,

Shewing what Alterations were made in the Second Edition.



Aving altered the Method of this Treatise, and made considerable Additions to it, it may justly be expected that I should give some Account thereof to the Reader. In the Preface to

the former Edition, I acquainted him, that I had taken notice of five Matters of Ancient Tradition. 1. That the World was formed out of a Chaos, by the Divine Wisdom and Power. 2. That there was an universal Flood of Waters, in which all Mankind perished, excepting some few, which were faved in an Ark or Ship. 3. That the World shall one day be destroyed by Fire. 4. That there is a Hea-

ven and a Hell, an Elysium and a Tartarus, the one to reward good Men, and the other to punish wicked; and both eternal. 5. That bloody Sacrifices were to be offered for the Expiation of Sin. And that of four of them I had occasion to treat in this Book; of two, that is to fay, of the Dissolution of the World by Fire, and the Eternal State that was to succeed (in reference to Man) either in Heaven or Hell, more directly: Of the other two, viz. The Primitive Chaos and Creation, and the General Deluge, oc-casionally and by way of digression, at the Request of some Friends. But now this Treatife coming to a second Impression, I thought it more convenient to make these several Discourses upon these Particulars, substantial Parts of my Work, and to dispose them according to the Priority and Posteriority of their Subjects, in Order of Time, beginning with the Primitive Chaos.

CONCERNING these Traditions, it may be enquired what the Original of them was; Whether they were of Divine Revelation, or Humane Invention? In answer

whereto,

As to the Second, That there was once a General Deluge, whereby this whole fublunary World was drown'd, and all Animals, both Man and Beast, destroyed, excepting only fuch as were preserved in an

Ark;

Ark; it being Matter of Fact, and feen and felt by Noab, and his Sons, there can be

no Doubt of the Original of that.

THE First, concerning the Chaos and Creation of the World, if it were not ancienter than the Scripture, it is likely it had its Original from the first Chapter of Genes, and the Chaos from the second Verse; And the Earth was without Form, and Void and Darkness was upon the Face of the Deep. But if it were more ancient, it must still, in all likelihood, be Divinely revealed, because Man being created last, and brought into a World already filled and furnished: And God being an Omnipotent, and also a Free Agent, who could as well have created the World in a Moment, or all together, as successively, it was impossible for Man by Reason to determine, which way He made choice of.

THE Third, concerning the future Diffolution and Destruction of the World by a General Conflagration, there being nothing in Nature that can demonstrate the Necessity of it: And a second Inundation and Submersion by Water, being in the Course of Nature a hundred times more probable, as I have shewn in the ensuing Discourses. And, therefore, we see God Almighty, to secure Man against the Apprehension and Dread of a second Deluge, made a Cove-

nant

### The Preface.

nant with him, to give him a visible Sign in Confirmation of it, never to destroy the World so again. And the Ancients, who relate this Tradition, delivering it as an Oracle or Decree of Fate, Ovid Metamorph. 1. Esse quoque in fatis reminiscitur affore tempus, &c. was likewise probable of Divine Revelation.

THE Fourth, That there shall be a future State, wherein Men shall be punished or rewarded accordingly, as they have done ill or well in this Life, and that State Eter-nal: Tho' the First Part may be demonstrated from the Justice and Goodness of Goo, because there being an unequal Distribution of Good and Evil in this Life, there must be a Time to set things streight in another World; yet it being so difficult to Humane Reason, to reconcile the Eternity of Punishments with the Justice and Goodness of God, this Second Part of the Tradition had need be well back'd by Divine Authority, to make it credible and current among Men.

As for the Last, tho' I meddle not with it in this Treatise, yet I will take Leave to fay so much concerning it, That, I think, those who held Sacrificing to have been a positive Command of God, and to have had its Original from Divine Institution, have the better Reason on their side. For that

that it is no eternal and indispensable Law of Nature, is clear, in that our Saviour abolished it. And many of the ancient Fathers look upon Sacrificing as fo unreasonable a Service, that therefore they thought God commanded it not to the Primitive Patriarchs; and though He did command it to the Jews, yet He did it only in condescension to their Weakness, because they had been used to such Services, and also the Nations round about them, to restrain them from Idolatry, and Sacrificing to strange Gods. Origen. Homil. 17. in Numer. Deus sicut per alium Prophetam dicit, non manducat carnes taurorum, nec sanguinem hircorum potat. Et etiam, ut alibi scriptum est, Quia non mandavi tibi de Sacrificiis vel victimis in die qua deduxi te de terra Ægypti. Sed Moyses bac ad duritiem cordis eorum, pro consuetudine pessima qua imbuti fuerant in Ægypto, mandavit eis, ut qui abstinere se non possent ab immolando, Deo saltem & non Damoniis immolarent. Other Quotations to this purpose may be seen in Dr. Outram De Sacrificiis. Indeed, it seems absurd to think or believe, that God should take any Pleasure in the Slaughter of innocent Beasts, or in the Fume and Nidor of burnt Flesh or Fat. Nor doth the Reason these Fathers alledge, of the Institution of Sacrifices, or Enjoining them to the Fews, satisfy, whatever Truth there there may be in it: For it is clear, that the main End and Design of God in instituting of them, was for Types and Adumbrations of the great Sacrifice of Christ to be offered upon the Cross for the Expiation of Sin: And, consequently, it is probable, that those also that were offered by the Ancient Patriarchs before the Law, had their Original from some Divine Command or Revelation, and the like Reason of their Institution, in reference to Christ.

But to leave that, I have in this Edition removed one Subject of Apology, and added another; fo that there still remain as many things to be excused or pleaded for.

They are,

FIRST, Writing so much; for which some perchance may censure me. I am not ignorant, that Men as they are mutable, so they love Change, and affect Variety of Authors as well as Books. Satiety even of the best things is apt to creep upon us. He that writes much, let him write never so well, shall experience, that his last Books, though nothing inferiour to his first, will not sind equal Acceptance. But for mine own part, tho' in general I may be thought to have written too much, yet is it but little that I have written relating to Divinity. It were a good Rule to be observed both by Writer and Reader, Not how much, but how well.

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well. He that cannot write well, had better spare his Pains, and not write at all. Neither is he to be thought to write well, who though he hath some good things thin set and dispersed, yet encumbers and accloys the Reader with a deal of useless and impertinent Stuff. On the contrary, he that writes well, cannot write too much. For, as Pliny the Younger saith well, Ut aliabona res, ita bonus Liber eò melior est quisque, quò major: As other good Things, so a good Book; the bigger it is, the better is it: Which holds as well of the Number as Magnitude of Books.

Secondly, Being too hasty in huddling up; and tumbling out of Books; wherein, I confels, I cannot wholly acquit myself of Blame. I know well, that the longer a Book lies by me, the perfecter it becomes. Something occurrs every Day in Reading or Thinking; either to add, or to correct and alter for the better. But should I deferr the Edition till the Work were absolutely perfect, I might wait all my Life-time, and leave it to be published by my Executors. Now my Age minding me of the Approach of Death; and posthumous Pieces generally proving inferiour to those put out by the Authors in their Life-time, I need no other Excuse for my Haste in publishing what I write. Yet I shall farther add, in Extenuation of the Fault,

### The Preface.

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if it be one, that however hasty and precipitate I am in writing, my Books are but small, so that if they be worthless, the Purchase is not great, nor the Expence of Time, wasted in the Perusal of them, very considerable. Yet, is not the Worth of a Book always answerable to its Bulk. But on the contrary, Meya βιβλίον is usually esteemed ἶσον τῷ μεγάλω κακῷ; for, ἐν τῷ μεγάλω τὸ εῦ, ἀλλὶ ἐν τῷ εῦ τὸ μέγα.

THIRDLY, The last thing for which I had need to apologize, is the Rendring the former Edition of this Treatise worthless, by making large Additions to this latter: In Excuse whereof I have no more to say, than I have already written in an Advertisement to the Reader, premised to my Discourse concerning the Wisdom of God; to which, therefore, I referr those who desire Satisfation in this Particular.





### TOTHE

# READER.

EST the Additions made to this Third Edition of these Discourses should lie under any Suspicion of being spurious, by reason they have

lain above seven Years unpublished after their justly celebrated Author's Death; I think it necessary to assure the Reader, that they were written in Mr. Ray's own Hand, and (as I find by his Papers) towards the latter End of the Year 1703, or Beginning of 1704: And in April, 1704, they were transmitted to his Booksellers, who had been very importunate for them, and hasty for a Third Edition; the former Impression being sold off, and the Book much

much called for, as they say in their Letters. But among st other Hindrances, that which chiefly retarded the intended Impression of the Book, was an ill State of Health befalling the principal Bookseller, which necessitated him to retire often into the Country from his Business, which was succeeded by his Death, and some time after by the Death of the other Partner also. By which means the Affairs of the Booksellers, who had the Right of the Copy, being in some Confusion, this Third Edition could not be attended unto till of late, when the Right of this and other of Mr. Ray's Copies came into another's Hands.

As for the Reasons inducing our excellent Author to make Additions to this, and other of his justly admired Pieces, he had (besides the Solicitations of the Booksellers) the earnest Requests of some of his most judicious and best Friends. And considering that his Additions tended to the greater Perfection of his Books, there is no great Reason for the Purchasers of the former Editions to complain of Injury, especially where

where the Purchase was but small. But for a farther Answer, I shall referr the Reader (as our Author in his Preface doth) to the Advertisement in his Wisdom of God. And that I might do what lies in me to obviate Complaints, and be serviceable, as far as I could, to the Purchaser's Prosit, I have noted the Additions made to this Third Impression, that they that bought the former Edition may transcribe them, if they think it worth their while.

### WILLIAM DERHAM.



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### ADDITIONS

### INTHIS

## Third Impression.

PAG. 10. From In this manner, to illustrate it.

Pag. 12. From When I say, to Mountain that way, p. 13.

Pag. 41. As for the Wells, to improbable.

Pag. 58. But notwithstanding, to insist upon it, p. 59.

Pag. 59. I think I have, to I am less inclinable.
Pag. 62. The first in, to in the 5th Chap.

Pag. 65. Consonant to the preceding Words of Abydenus.

Pag. 67. Pliny faith of the City of Joppa, that it

Was built before the Flood.

Pag. 70. To this may be replied, to the light-

est, p. 71.

Pag. 73. Natural; and that no ordinary, to Hea-

vens were opened.

Pag. 74. After no inconsiderable thing, seven Lines of the former Edition are left out.

Ibid.

Ibid. From Cloud, who knows? the following Part of the Paragraph is left out, and in its room is set, That the Ocean, to Scriptures, p. 75.

Pag. 79. Madidis Notus alis. Ovid. Metam.

Pag. 84. But to put, to p. 101, 102.

Pag. 89. Dr. Hook's, to believe there are not. Pag. 114. That Rains, to the Bottom of the Page.

Pag. 115. The Fruitfulness, to of Nile. Q. Whether this Paragraph be not misplaced?

Pag. 116. But because (as I said before) to touch the Ground. After which, three Paragraphs in p. 117, 118, 119, 120. of the former Edition, are left

Pag. 118. I shall leave the Reader to compare the Alteration made, from This Hypothesis, to highest Mountains, with p. 122. of the former Edition, If any object.

Ibid. (as credibly Authors, to those of Mexico)

p. 119.

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Pag. 126. Dr. Woodward, to Deluge.

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Pag. 138. This Argument is, to living Shark,

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Pag. 218. Notwithstanding all these, to the End of the Page 226.

Pag. 228. Here I might take, to I have digref-

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Pag 276. For, 1. It could, to a Flame.

Pag. 291. In this Conjecture, to discoursed at large, p. 294.

Pag. 443. Now that it is unjust, to enforce Obe-

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Pag. 450. Instead of punishing an Offender, it is having an Offender punished by the Magistrate,

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Ibid. After Veracity? compare the Alterations, viz. what is left out in the former, and added in this Edition, from Veracity, to digressed, p. 452.

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### DISCOURSE I.

**搬送的基础的基本来来来来来来来来来来来来来,不可能是是是来来来来来** 

# Of the Primitive CHAOS and Creation of the World.

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N the First Edition of this Treatise, this Discourse concerning the *Primitive Chaos* and *Creation* of the World, and that other concerning the

Destruction thereof by the Waters of the General Deluge, in the Days of Noah, were brought in by way of Digression; because I designed not at first to treat of them, but only of the Conflagration or Dissolution of the World by Fire; but was afterwards, when I had made a considerable Progress in the Dissolution, at the Instance of some Friends, because of their Relation to my Subject, prevailed upon to say something of them. But now that I am at Liberty so to do, I shall not handle them any more by the by, but make

them substantial Parts of my Book, and dispose them, as is most natural, according to their Priority and Posteriority in Order of Time, beginning with the Chaos and Creation.

#### CHAP. I.

Testimonies of the Ancient Heathen Writers concerning the Chaos, and what they meant by it.



T was an ancient Tradition among the Heathen, that the World was created out of a Chaos.

FIRST of all the ancient Greek Poet Hefiod, who may contend for Antiquity with Homer himself, makes mention of it in his Theogonia, not far from the Beginning, in these Words:

Ήτοι μεν πρώτιςα Χάος γένετ.

First of all there was a Chaos. And a few Verses after, speaking of the immediate Production or Offspring of the Chaos, he faith,

Έπ Χάεος δ' Έρεβος τε, μέλαινά τε Νύξ εγένοντο.

From Chaos proceeded Hell, and Night, [or Darkness] which seems to have its Foundation or Occasion from the second Verse of

the first Chapter of Genesis; And the Earth was without Form, and void; and Darkness was upon the Face of the Deep. Of this Testimony of Hesiod, Lactantius takes notice, and censures it, in the first Book of his Institutions, cap. 5. Hesiodus non à Deo conditore sumens exordium, sed à Chao, quod est rudis inordinataque materia consusa congeries. Hesiod not taking his Beginning from God the Creator of all Things, but from the Chaos, which is a rude and inordinate Heap of consused Matter. And so Ovid describes it in the Beginning of his Metamorphosis;

Quem dixere Chaos, rudis indigestaque moles, Nec quicquam nisi pondus iners congestaque eòdem

Non bene junctarum discordia semina rerum.

That is;

One Face had Nature, which they Chaos nam'd, An undigested Lump, a barren Load, Where jarring Seeds of things ill-join'd abode.

Others of the Ancients have also made mention of the Chaos, as Aristophanes in Avibus,

Χάος ἦν καὶ Νὺξ, Ἐρεβός τε μέλαν πρῶτον, &c.

And Lucian in the Beginning of his first Book,

Antiquum repetent iterum Chaos omnia, &c.

Of the Formation of all the Parts of the World out of this Chaos, Ovid, in the place B 2 fore-

fore-quoted, gives us a full and particular Description; and Euripides before him a brief one,

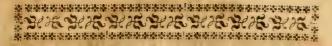
'Ο δ' Οὐρανὸς καὶ γαῖά τ' ἦν μοςΦὴ μία, Έπεὶ δ' ἐχωρίσθησαν ἀλλήλων, &c.

The Heaven and Earth were at first of one Form; but after they were separated, the Earth brought forth Trees, Birds, Beasts, Fishes, and Mankind.

The like Account also the ancient Philosopher Anaxagoras gives of the Creation of the World, beginning his Philosophy thus; Πάντα χρήματα ἦν ὁμες εἶτα Νες ἐλθὼν αὐτὰ διεκόσμησε that is, All things (at first) were together, or mingled and confused, then Mind supervening disposed them in a beautiful Order.

THAT which I chiefly dislike in this Opinion of theirs, is, that they make no mention of the Creation of this Chaos, but seem to look upon it as self-existent and improduced.





#### CHAP. II.

That the Creation of the World out of a Chaos, is not repugnant to the Holy Scripture.



HIS Opinion of a Chaos, if so-berly understood, not as self-existent and improduced, but in the first place created by GoD, and preceding other Beings,

which were made out of it, is not, so far as I can discern, any way repugnant to the Holy Scripture, but on the contrary rather confonant and agreeable thereto. For Moses, in the History and Description of the Creation, in the first Chapter of Genesis, saith, not that God created all things in an instant in their full State and Perfection, but that He proceeded gradually and in Order, from more imperfect to more perfect Beings, first beginning with the Earth, that is, the Terraqueous Globe, which was made tohu vabohu, without Form, and void, the Waters covering the Face of the Land, which were afterwards separated from the Land, and gathered together into one place. Then He created out of the Land and Water, first Plants, and then Animals, Fishes, Birds, Beasts, in Order, and last of all formed the Body of Man of the Dust of the Earth.

AND

AND whereas there is no particular mention made of the Creation of Metals, Minerals, and other Fossils, they must be comprehended in the Word Earth, as the Water itself also is in the second Verse of this first

Chapter.

IT feems, therefore, to me consonant to the Scripture, That God Almighty did at first create the Earth or Terraqueous Globe, containing in itself the Principles of all simple inanimate Bodies, or the minute and naturally indivisible Particles of which they were compounded, of various but a determinate Number of Figures, and perchance of different Magnitudes; and these variously and confusedly commixed, as though they had been carelesly shaken and shuffled together; yet not so, but that there was Order observed by the most Wise Creator in the Disposition of them. And not only so, but that the fame Omnipotent Deity did create also the Seeds or Seminal Principles of all Animate Bodies, both Vegetative and Sensitive; and dispers'd them, at least the Vegetative, all over the superficial Part of the Earth and Water. And the Notion of such an Earth as this is, the Primitive Patriarchs of the World delivered to their Posterity, who, by Degrees annexing fomething of Fabulous to it, imposed upon it the Name of Chaos.

THE next Work of the Divine Power and Wisdom, was the Separation of the Water

from

from the dry Land, and Raising up of the Mountains, of which I shall treat more par-

ticularly in the next Chapter.

To which follows the Giving to both Elements a Power of hatching, as I may fo fay, or quickening and bringing to Perfection the Seeds they contained; first the more imperfect, as Herbs and Trees; then the more perfect, Fish, Fowl, Four-footed Beasts, and creeping Things or Infects. Which may be the Meaning of those Commands of GoD, which were operative and effectual, communicating to the Earth and Water a Power to produce what He commanded them, Gen. i. 11. Let the Earth bring forth Grass, &c. and v. 20. Let the Waters bring forth abundantly the moving Creature that bath Life, and Fowl that may fly above the Earth, &c. And v. 24. Let the Earth bring forth the living Creature after his Kind, Cattle and creeping thing, and Beast of the Earth after his Kind.

So the Earth was at first cloathed with all Sorts of Herbs and Trees; and both Earth and Water furnished with Inhabitants. And this the Ancients understood by their dianos-

MUDIS.

But whether out of præ-existing Seeds, as I suppose, or not, certain it is, that God at that time did give an extraordinary and miraculous Power to the Land and Water, of producing Vegetables and Animals; and after there were as many of every kind brought

forth,

forth, as there were Seeds created at first; or as many as it seemed good to the Divine Creator to produce without Seed; there remained no farther Ability in those Elements to bring forth any more; but all the succeeding owe their Original to Seed; God having given to every Species a Power to generate or propagate its Like.

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#### CHAP. III.

Of the Separating the Land and Water, and Raising up the Mountains.

UPPOSING that GOD Almighty did at first create the Terrestrial Globe, part-ly of solid and more ponderous, partly of fluid and lighter Parts; the folid and ponderous must needs naturally subside, the fluid and lighter get above. Now, that there were fuch different Parts created, is clear, and therefore it is reasonable to think, that the Waters at first should stand above and cover the Earth: And that they did so, seems evident to me from the Testimony of the Scripture. For, in the History of the Creation, in the first Chapter of Genesis, ver. 2. it is said, That the Spirit of God moved upon the Face of the Waters, intimating that the Waters were uppermost. And God said, ver. 9. let the Waters under the Heaven be gathered together

together into one place, and let the dry Land appear. Whence, I think, it is manifest to any unprejudiced Reader, That before that time the Land was covered with Water: Especially, if we add the Testimony of the Holy Psalmist, Psalm civ. ver. 6, and 9. which is as it were a Comment upon this Place of Genesis, where, speaking of the Earth at the Creation, he faith, Thou coveredst it with the Deep as with a Garment; the Waters stood above the Mountains . . . and, ver. 9. That they turn not again to cover the Earth. And that this Gathering together of Waters was not into any subterraneous Abyss, seems likewise clear from the Text: For it is said, That God called this Collection of Waters Seas, as if it had been on purpose to prevent such a Mistake.

Whether this Separation of the Land and Water, and Gathering the Waters together into one Place, were done by the immediate Application and Agency of God's Almighty Power, or by the Intervention and Instrumentality of Second Causes, I cannot determine. It might possibly be effected by the same Causes that Earthquakes are, viz. subterraneous Fires and Flatus's. We see what incredible Effects the Accension of Gunpowder hath: It rends Rocks, and blows up the most ponderous and solidWalls, Towers, and Edifices, so that its Force is almost irresistible. Why then might not such a propor-

tionable

tionable Quantity of fuch Materials fet on fire together, raise up the Mountains themfelves, how great and ponderous foever they be, yea the whole Superficies of the dry Land (for it must all be elevated) above the Waters? And truly to me the Psalmist seems to intimate this Cause, Psalm civ. 7. For, after he had faid, The Waters stood above the Mountains; he adds, At Thy Rebuke they fled, at the Voice of Thy Thunder they hasted away. Now, we know that an Earthquake is but a fubterraneous Thunder, and then immediately follows, The Mountains ascend, the Valleys descend, &c. In this Manner of raising up the dry Land at first, and casting off the Waters, I was well pleased to find the Right Reverend Father in God, Simon, Lord Bishop of Ely, to agree with me in his excellent Commentary upon Genesis, cap. i. ver. 9. This, faith he, we may conceive to have been done by fuch Particles of Fire as were left in the Bowels of the Earth, whereby fuch 'Nitrofulphureous Vapours were kindled, as made an Earthquake, which both lifted up the Earth, and made Receptacles for the Waters to run into; as the Psalmist (otherwise 'I should not venture to mention this) seems in the forementioned Place to illustrate it. If there might be a high Hill raifed up near the City Trazen, out of a plain Field, by the Force of a subterraneous Fire or Flatus, as Quid tells us:

Ov. Metamorph.

lib. 15.

Est prope Pitthæam tumulus Træzena sine ullis Arduus arboribus, quondam planissima campi Area, nunc tumulus: nam (res horrenda relatu) Vis fera ventorum, cæcis inclusa cavernis, Expirare aliqua cupiens, luctataque frustra Liberiore frui cælo, cum carcere rima Nulla fuit toto, nec pervia flatibus esset, Extentam tumefecit humum, ceu spiritus oris Tendere vesicam solet, aut derepta bicornis Terga capri; tumor ille loci permansit, & alti Collis habet speciem, longoque induruit ævo:

A Hill by Pitthæan Træzen mounts, uncrown'd With Sylvan Shades, which once was level Ground,

For furious Winds (a Story to admire)
Pent in blind Caverns, struggling to expire;
And vainly seeking to enjoy th' Extent
Of freer Air, the Prison wanting Vent,
Puffs up the hollow Earth extended so,
As when with swelling Breath we Bladders
blow:

The Tumour of the Place remained still, In time grown solid, like a lofty Hill:

A parallel Instance hereto we have of later Date, of a Hill not far from Puzzuolo [Puteoli] beside the Gulf of Baiæ, which I myself have view'd and been upon. It is by the Natives call'd Monte di cenere, and was raised by an Earthquake, Sept. 29. 1538. of about one hundred Foot perpendicular Altitude, though

though some make it much higher: According to Stephanus Pighius, it is a Mile Ascent to the Top, and four Miles roundat the Foot: We indeed judged it not near fo great. The People fay it bears nothing; nothing of any Use or Profit, I suppose, they mean: Else I am fure, there grows Heath, Myrtle, Mastick-Tree, and other Shrubs upon it. It is a foungy kind of Earth, and makes a great Sound under a Man's Feet that stamps upon it. The same Earthquake threw up so much Earth, Stones and Ashes, as quite filled up the lacus Lucrinus, so that there is nothing left of it now, but a fenny Meadow. When I fay, that this Mountain was raised by an Earthquake, I do not mean, that the meer Succussion, or Shaking of the Earth, raised up the Mountain; but that the same Cause which shook the Earth, that is, subterraneous Fire, cast up the Materials which raised the Mountain, and of which it doth confift, that is, Stones, Cinders, Earth, and Ashes. Indeed, under the Word Earthquake, in this Work, I comprehend the Concomitants and Confequents of an Earthquake, and the efficient Cause of it; which is a subterraneous Fire, as I have expressed myself, pag. 10. line 8. of the First Edition.

NEITHER, by the Elevation of Mountains, do I mean, that they were all heaved up, as it were by a *Flatus*, but only fuch, where the enclosed Fire was not of Force sufficient

to make its way out, or found not Spiracula to vent itself. Otherwhere, where it was strong enough to rend the superincumbent Mass of Earth, or found some Rists or Spiracula to break out by, there it issued out with great Force, and threw up abundance of Stones, Ashes, and Earth, and so raised

up a Mountain that way.

If fuch Hills, I fay, as these, may be, and have been elevated by subterraneous Wild-sire, Flatus, or Earthquakes, si parvis liceat componere magna, if we may compare great things with small, why might not the greatest and highest Mountains in the World be raised up in like manner by a subterraneous Flatus or Wild-sire, of Quantity and Force sufficient to work such an Effect; that is, that bears as great a Proportion to the superincumbent Weight and Bulk to be elevated, as those under these smaller Hills did to theirs?

But we cannot doubt this may be done, when we are well assured that the like hath been done. For the greatest and highest Ridge of Mountains in the World, the Andes of Peru, have been, for some hundreds of Leagues in Length, violently shaken, and many Alterations made therein by an Earthquake that happened in the Year 1646. mentioned by Kircher in his Arca Noa, from the Letters of the Jesuites. And Pliny tells us, of his own knowledge, that the Alps and Appennine have often been shaken with Earth-

quakes:

quakes: Exploratum est mihi Alpes Appenninúmque sapius tremuisse, lib. 2. cap. 80. Nay, more than all this, we read, that in the time of the Emperor Valentinian the First, there was an Earthquake that shook all the known World. Whilst this Innovator [that is, Procopius] was yet alive, (saith Amm. Marcellinus, lib. 26. cap. 14.) Horrendi tremores per omnem orbis ambitum grassati sunt subitò, quales nec fabula, nec veridica nobis antiquitates exponunt. Paulò enim post lucis exortum, densitate prævia fulgurum acrius vibratorum tremefacta concutitur omnis terreni stabilitas ponderis, mareque dispulsum retrò fluctibus evolutis abscessit, ut retecta voragine profundorum species natantium multiformes limo cernerentur hærentes, valliumque vastitates G montium, ut opinari dabatur, suspicerent radios solis quos primigenia rerum sub immensis gurgitibus amandavit, &c. That is, Horrid Earthquakes suddenly raged all the World over; the like whereto, neither Fables nor true Antiquities ever acquaint us with, or make mention of. For soon after Break of Day, redoubled, smart, and violent Flashes of Lightning preceding, the stable and ponderous Mass of the whole Earth was shaken, and made to tremble; and the Sea, with revolved Waves, was driven backwards, and forced so far to recede, that the Bottom of the great Deeps and Gulfs being discovered, multisorm Species of Fishes, for saken by the Water, were

seen lying on the Mud; and those vast Valleys and Mountains, which the primigenial Nature had sunk deep, and concealed under immense Waters, (as we had reason to think) saw the Sun-beams. Wherefore, many Ships resting upon the dry Ground, the Mariners wandring carelesty up and down through the small Reliques of the Waters, that they might gather up Fishes, and other things, with their Hands; the Sea-Waves being, as it were, grieved with their Repulse, rise up again, and making their way backward through the fervid Shallows, violently dashing against the Islands and extended Shores of the Continents, threw down, and levelled innumerable Edifices in Cities, and where else they were found. Where, see more of the Effects of it. Of this Earthquake we find mention also in Zosimus and Orosius.

If this Story be true, as certainly it is, we have no reason to doubt of the Possibility of the dry Land being thus raised at first by subterraneous Fire. And with us agrees the learned Thomas Lydyat, in his Philosophical Disquisition concerning the Origine of Fountains, &c. being of Opinion not only that it might be so, but that it was so. I shall give you his own Words, Ubi aliud quoque summe admirationis plenum Terremotus atque Ignis subterranei effectum notandum venit, montium sci. generatio. And then having mentioned the raising up Islands in the

Sea by fubterraneous Fires, he proceeds thus, Quomodo etiam omnes montes qui uspiam sunt, una cum ipsis terris Continentibus (quæ nibil aliud sunt quam sparsi in Oceano majores montes sive insula) in mundi primordiis, (quando nimirum Ignis de quo loquimur, in terra visceribus à potentissimo mundi Conditore accensus est) extitisse maxime fit verisimile; mari in cava loca recedente, & terrestribus Animalibus (ejusdem Divini numinis sapientissimo consilio) habitandi locum relinquente. That is, After which Manner also all the Mountains in the World, together with the Continents themselves, (which are nothing else but great Mountains or Islands scattered in the Ocean) in the beginning of the World, when the Fire of which we speak was first kindled in the Bowels of the Earth by the Almighty Creator, were (as it is most highly probable) originally raised up; the Sea receding into the Cavities and depressed Places, and by the most wife Counsel of the Supreme Deity, leaving Room for Terrestrial Animals to inhabit. Than which nothing can be faid more consonant to what we have written: And I was highly pleased and satisfied to find such Philosophy in so learned and judicious a Writer.

AND in Confirmation of this Doctrine, Strabo himself, though he had not, nor could have any Knowledge at all of the prodigious Effects of Gunpowder, yet makes no Difficulty to affirm the Possibility of raising up

as well the Continents and Mountains, as the Islands, by Earthquakes and subterraneous Fires; toward the latter end of the first Book of his Geography, discoursing thus: Καὶ γάρ σεισμοί, καὶ ἀναΦυσήματα, καὶ ἀποιδήσεις της ύΦάλε γης μετεωρίζεσι και την θάλασσαν. Ού γαρ μύδεοι μεν ανενεχθήναι δύνανται, καί μικραί νήσοι, μεγάλαι δ' έ' έδε νήσοι μεν, ήπειegi d'é. And a little after, Kai Thu Sinehian εδέν τι μαλλον αποβρώγα της Ιταλίας είναζοι τίς, αν, η ἀναβληθεῖσαν ύπὸ τε Αἰτναίε πυς εκ βύθε συμμεῖναι. That is, For Earthquakes and Eruptions of Flatus [Blasts] or sudden Tumors of the Submarine Earth, or Bottom of the Sea, may swell and elevate the Sea; so that not only small Lumps or Masses of Matter, but even Islands may be raised up in the midst of it. Neither if small Islands can be raised, may not great ones too; neither may Islands be heaved up, and not Continents as well. And Sicily may as well be thought to have been thrown up out of the Deep by the Force of the Atnæan Fire, and sticking together to have continued above Water, as to have been a Piece broken off from Italy. And the like may be faid of the Islands of Lipara and Pithecufa.

ρας τέσσαρας, ώςε πᾶσαν ζεῖν καὶ Φλέγεσθαι τὴν θάλασσαν, ἀνεΦύσησαν κατ ολίγον εξαιεθμένην ως ἀν οργανικῶς καὶ συντεθειμένην ἐκ μύδρων νῆσον, δώδεκα ςαδίων τὴν περίμετρον. That is, Between Thera and Therasia Flames issuing out of the Sea for four Days, (so that the whole Sea boiled and burned) blew up by little and little, as if it had been raised by Machines, and composed of great Lumps or Masses, an Island of Twelve Furlongs Circumference.

AND Pliny tells us, that the Island Hiera, near Italy, in the Time of the Social War, together with the Sea itself, did burn for several Days. His Words are, In medio Mari Hiera insula juxta Italiam cum ipso Mari ar-

sit per aliquot dies.

And Strabo, lib. 1. reports, That about Methone, in the Bay of Hermione, there was Earth raifed, and as it were blown up to the Height of seven Furlongs by a fiery Breath or Exhalation, which by Day-time was unaccessible by reason of Heat and sulphureous Stench, but smelling sweet by Night, and shining so as to be seen afar off, likewise casting such a Heat, as to cause the Sea to boil for sive Furlongs, and to render it troubled for the Space of twenty; raising up therein a Baich or Bank of Stones as big as Towers.

THESE Instances I alledge, principally because they seem to demonstrate a Possibility of the Accension of Fire in the Earth when it was wholly covered with Water, and had no Entercourse or Communion with the superiour or external Air; which is the main and most material Objection against the Elevation of the dry Land at the beginning by subterraneous Fires.

You will fay, If the Mountains be thus heaved, or else cast up, by subterraneous Fires, the Earth must needs be hollow all underneath them, and there must be vast Dens and Caverns dispers'd throughout them.

I ANSWER, 'Tis true indeed, so there are; as may undeniably be proved by Instances. For the new Mountain we mentioned at Puteoli, that was thus raised, being of a Mile steep Ascent, and four Miles round at the Foot, a proportionable Cavity must be left in the Earth underneath: And the Mountain Ætna, at the last Eructation alone, having disgorged out of its Bowels so great a Flood of melted Materials, as if spread at the Depth and Breadth of three Foot, might reach four times round the whole Circuit of the Terraqueous Globe, there must likewise an answerable Vault be left within. You will demand, How then comes it to pass, that they stand fo firm, and do not founder and fall in, after fo many Ages? I answer, that they may stand, appears by the foresaid new-raised Mountain. For notwithstanding the Cavity under it, it hath stood firm and staunch, without the least Sinking or Subsidency, for above an hundred and fifty Years; neither is

there any great Sinking or Falling in at Ætna itself; at least in no degree answerable to its ejected Matter. This Affertion is confirmed by the unanimous Vote and Testimony of all Writers, Ancient and Modern, who have handled this Subject. But Alphonsus Borellus supposes them not to have duly considered the Matter, and calculated the Quantity of the ejected Materials, and the Bulk of the Mountain, and compared them together; but to have been carried away by the Prejudices and Persuasions of the People, who looking upon the Top of the Mountain at a Distance, think it but a small thing in Comparison of the ejected Sand and Ashes that cover'd whole Countries; and those vast Rivers of liquid Stones, and other Ingredients, that ran down so many Miles, whereas he, by a moderate Computation, found out that the Total of what the Mountain disgorged at the last Eruption, amounted not (as I remember) to the fourteen thousandth Part of the Solidity of the whole Mountain. The reason is the Strength and Firmness of their Vaulture and Pillars, sufficient to support the superincumbent Weight. And yet in some Places there are Sinkings and Fallings in, which have afterwards become Valleys, or Pools of Water. But as for the Cavities that are lower than the Superficies of the Ocean, the Water, where it could infinuate and make its Way, hath filled them up to that Height. I fay, where it could

could make its Way, for that there are many empty Cavities even under the Sea itself, appears by the shaking and heating too of the very Water of the Sea in some Places in Earthquakes, and raising up the Borders or Skirts of it, so as to drive the Water a great way back, and the raising up new Islands in the middle of the Sea; as Delos and Rhodes, and Anaphe, and Nea, and Alone, and Hiera, and Thera, mentioned by Pliny, Hist. lib. 2. c.87. and Thia in his own time; and Therasia in the Ægean in Seneca's time, which was heaved up in the Sight of many Mariners then pre-

fent and looking on.

I am not ignorant, that the learned Man I lately quoted, I mean Alph. Borellus, in his Book De Incendiis Ætnæ, is of Opinion, that the middle Part, or, as he calls it, the Kernel of that Mountain, is firm and folid, without any great Caverns or Vacuities, and that all those Vaults and Cavities in which the Fire rages, are near the Superficial or Cortical Part: And derides those who fancy that Ætnæ, the Æolian Islands, Lipara, Strongyle, &c. and Ve-suvius, do communicate by subterraneous Channels and Passages running under the Bottom of the Sea. But saving the Respect due to him for his Learning and Ingenuity, there is good Authority on their Side; and our Ratiocinations against the Possibility of such a thing must give place to the clear Proof of Matter of Fact. Julius Ethnicus,

an ancient Writer, quoted by Ludovicus Vives, in his Annotations upon S. Augustin, De Civitate Dei, gives us this Relation; Marco Æmilio, Lucio Aurelio Consulibus, Ætna mons terramotu Ignes super verticem late diffudit, & ad Insulam Liparam mare efferbuit, o quibusdam adustis navibus vapore plerosque navaleis exanimavit: Piscium vim magnam exanimem dispersit, quos Liparenses avidius epulis adpetenteis contaminatione ventris consumpti sunt, ita ut nova pestilentia vastarentur insulæ. That is, Marcus Æmilius, and Lucius Aurelius, being Consuls, Mount Ætna being shaken by an Earthquake, cast forth and scattered Fire from its Top far and wide. At which time, the Sea, at the Island of Lipara, was boiling hot, and some Ships being burnt, most of the Seamen were stifled with the Va-pour: Besides, it dispersed abroad a power of dead Fish, which the Liparensians greedily gathering up and eating, were confumed with a contagious Disease in their Bellies; so that the Islands were wasted with a new sort of Pestilence. And Father Kircher the Jesuite, in the Preface to his Mundus Subterraneus, giving a Relation of an Earthquake which shook a great Part of Calabria, and made notable Devastations there, which himself saw, and was, in Anno 1638. clearly demonstrates, that Ætna, Stromboli, and the Mountains of Calabria, do communicate by Vaults and Caverns passing under the Bottom of the Sea. L.fhall

I shall insert but one Passage out of him, referring the Reader to the fore-quoted Preface for the rest. Hisce calamitatibus (saith he) dum jactamur, ego curiosuis intuitus Strongylum, 60 ferè milliarium intercapedine dissitum, illum insolito modo furere notavi, &c. i. e. While we were tost with these Calamities, I beholding curiously the Island Stromboli, about 60 Miles distant, observed it to rage after an unusual manner, for it appeared all filled with Fire in such Plenty, that it seemed to cast forth Mountains of Flame; a Spectacle horrid to behold, and formidable to the most undaunted Spirit. In the mean time, there was a certain Sound perceived as it were of Thunder, but by reason of the great Distance from whence it came, somewhat obscure, which by degrees proceeding forward in the Subterraneous Conduits, grew greater and greater, till it came to the Place just underneath us, [they were at Lopez by the Sea] where it shook the Earth with such a Roaring, or Murmur and Fury, that being not able to stand any longer upon our Legs, we were forced, to support ourselves, to catch hold upon any Shrub or Twig that was near us, lest our Limbs should be put out of Joint by too much Shaking and Concussion. At which time happened a thing worthy of immortal and eternal Memory, viz. the Subversion of the famous Town of S. Eufemia; which he goes about to relate. As for Vesuvius, if that be not hollow down to

the very Roots and Foundations of it, how comes it to pass, that at the Times of its De-flagrations it should vomit out such Floods of boiling Waters? as, if we had not read of them in Histories, and been told so by our Guide when we ascended that Mountain, we must needs have perceived ourselves, by the mighty Gulls and Channels in the Sides thereof, it being of itself near the Top so spungy and dry, that it is more likely to imbibe than to cast off much Rain in the Winter-time. And again, what causes the Sea to recede at those Times, and that to so great a Distance, that the Galleys have been laid dry

in the very Haven of Naples?

Howbelt, I cannot positively assert the Mountains thus to have been raised. But yet, whether without Means, or by whatsoever Means it were, a Receptacle for the Waters was prepared, and the dry Land and Mountains elevated, so as to cast off the Waters, on the third Day, and which is wonderful, the Cavities made to receive the Waters, and the whole terra surma, or dry Land, with its Mountains, were so proportioned one to the other, as that the one was as much depressed below the Shores, as the other was elevated above them. And, as if the one had been taken out of the other, the Sea, with all its Creeks, and Bays, and Inlets, and other Appendants, was made, and is very near equal to the whole dry Land,

with

with its Promontories and Mountains, if not in Superficies, yet in Bulk or Dimensions, though some think in both. Which Equality is still constantly maintained, notwith-standing all Inundations of Land, and Atterations of Sea; because one of these doth always nearly balance the other, according to the vulgar Proverb we have before-mention'd, What the Sea loses in one Place, it gains in another. If any shall demand, How the Sea comes to be gradually depressed, and deepest about the Middle Part; whereas the Bottom of it was in all likelihood equal while the Waters covered the whole Earth? I answer, the same Cause that raised up the Earth, whether a subterraneous Fire or Flatus, raised up also the Skirts of the Sea, the Ascent gradually decreasing to the Middle Part, where, by reason of the Solidity of the Earth, or Gravity of the incumbent Water, the Bottom was not elevated at all. For the enclosed Fire in those Parts where its first Accension or greatest Strength was, raised up the Earth first, and cast off the Waters, and thence spreading by degrees, still elevated the Land, and drove the Waters farther and farther; till at length the Weight of them was too great to be raifed, and then the Fire brake forth at the Tops of the Mountains, where it found least Resistance, and dispers'd itself in the open Air. The Waters also, where they found the Bottom fandy, or yield-

ing,

ing, made their way into all those Cavities the Fire had made and left, filling them up as high as the Level of the Ocean. Neither let any Man imagine, that the Earth under the Water was too foft and muddy to be in this manner raised by subterraneous Fire; for I have shewn before, that the Bottom of the Sea is so saddened and hardened by the Weight of the incumbent Water, that the High-ways, beaten continually by Horses and Carriages, are not more firm and solid. But omitting this (which is only a Conjecture) I shall discourse a little more concerning the

Equality of Sea and Land.

It hath been observed by some, that where there are high Cliffs or Downs along the Shore, there the Sea adjoining is deep; and where there are low and level Grounds, it is shallow; the Depth of the Sea answering to the Elevation of the Earth above it: And as the Earth from the Shores is gradually higher and higher, to the Middle and Parts most remote from the Sea, as is evident by the Descents of the Rivers, they requiring a constant Declivity to carry them down; so the Sea likewise is proportionably deeper and deeper from the Shores to the Middle. So that the Rising of the Earth from the Shores to the Mid-Land, is answerable to the Descent or Declivity of the Bottom of the Sea from the fame Shores to the Mid-Sea. This Rifing of the Earth from the Shores gradually to the MidMid-land, is so considerable, that it is very likely the Altitude of the Earth in those Mid-land Parts above the Superficies of the Sea, is greater than that of the Mountains above the Level of the adjacent Lands. To the Height of the Hills, above the common Superficies of the Earth, do answer, in Brerewood's Opinion, the extraordinary Depths or Whirl-pools that are found in the Sea, defcending beneath the ordinary Bottom of the Sea, as the Hills ascend above the ordinary Face of the Land. But this is but a Conje-Eture of his; and to me it feems not very probable, because it is not likely there should be, in the Sea, extraordinary Depths of that vast Length and Extension, as those huge Ridges of Mountains that run almost quite through the Continents: And because I have observed the Waters of Rivers that flow gently, but especially of the Sea, to level the Bottoms of their Channels and Receptacles, as may be seen in those Parts of the Sea whose Bottoms are uncovered at Low-water; and in dry Lands that have been deferted by the Sea, as the Fens in the Isle of Ely, and the Craux in Provence in France, &c. which appear to be a perfect Level, as far as one can ken. Though possibly the Motion of the Sea may not descend down so low as those Depths, and fo may not level the Bottoms of them.

Bur against what I have said concerning the Leveling of the Bottom of the Sea, it may be objected, That Mariners and Divers sind no such thing, but the quite contrary, viz. That the Bottom of the Sea is as unequal as the Land, sometimes ten or twelve Fathoms on one Side of the Ship, and one hundred on the other, as Mr. Boyle tells us in his Relations about the Bottom of the Sea, consonant whereto are the Accounts of Divers. And I have (saith my worthy Friend Dr. Tanc. Robinson, in one of his Letters to me) read in Voyages, of vast Rocks of Salt

observ'd in some Places under the Sea.

To which I answer, That I should indeed have excepted fuch Places as are rocky, which bear a very little Proportion to the Latitude and Extent of the Sea, and are for the most part not far off the Land. I myself have seen fo much of the Bottom of the Sea, round about the Coasts of England, and a good Part of the Low-Countreys, of Italy and Sicily, that, I think, I may boldly pronounce in general, That where the Bottom of the Sea is not rocky; but Earth, Owze, or Sand, (and that is incomparably the greatest Part of it) it is by the Motion of the Waters, so far as the Reciprocration of the Sea extends to the Bottom, brought to a Level; and if it should be now unequal, would in time be level'd again. By Level, I do not mean so as to have no Declivity, (for the Reciprocration preserves

that,

that, the Flood hindring, in good measure, the constant Carrying down of the Bottom) but only to have an equal, uniform, and easie Descent from the Shores to the Deeps. Now, all those Reports of Divers and Navigators referr, for the most part, to rocky Places. For Mariners feldom found but in fuch Places, and in Shallows; and Urinators have no reafon to dive where the Bottom is level and fandy. And that the Motion of the Waters descends to a good Depth, I prove from those Plants that grow deepest in the Sea, because they all generally grow flat in manner of a Fan, and not with Branches on all sides, like Trees; which is so contrived by the Providence of Nature, because the Edges of them do, in that Posture, with most ease, cut the Water flowing to and fro: And should the flat Side be objected to the Stream, it would be turned Edgewise by the Force of it; because, in that Site it doth least resist the Motion of the Water: Whereas, did the Branches of those Plants grow round, as in Trees, they would be thrown down backward and forward every Tide. Nay, not only the herbaceous and woody submarine Plants, but even the Lithophyta themselves affect this manner of Growing, if they be any thing Ramole, and rife to a considerable Height, as I have observed in various Kinds of Corals and Pori. Hence I suspect those Relations of Trees growing at the Bottom of the Sea, and

and bringing forth Fruit there. As for the Maldiva Nut, till better Information, I adhere to Garcias his Opinion, That the Trees that bare those Nuts were, of old time, together with the Land on which they grew, overwhelmed by the Inundations of the Sea, and there hardned in the Earth, and afterwards cast up by the Working of the Sea again. Which thing is very probable; for to this day, some of those Maldiva Islands are now and then drowned, and fwallowed up by the Sea. Farther, I do believe, that in the great Depths of the Sea there grow no Plants at all, the Bottom being too remote from the external Air; which, though it may pierce the Water fo low, yet I doubt, whether in Quantity sufficient for the Vegetation of Plants. Nay, we are told, that in those deep and bottomless Seas, there are no Fish neither: Yet, not because there are no Plants or Infects to feed them; for that they can live upon Water alone, Rondeletius his Experiment about keeping them in a Glass, doth undeniably prove; but because their Spawn would be lost in those Seas, the Bottom being too cold for it to quicken there. This Answer and Discourse, though it be inserted into another Treatise, yet properly belongs to this place, to which I have, therefore, restored it; begging the Reader's Excuse for this Repetition. I now proceed.

THAT

THAT it is consonant to the best Observations of the Height of the Earth and its Mountains above the Superficies of the Sea; and of the Depth of the Sea; that the one is answerable to the other. Varenius, in his Geogr. witnesseth, p. 152. Caterum ex observata bactenus in plerisque locis profunditate Oceani, manifestum est, eam fere æqualem Altitudini sive Elevationi montium & locorum Mediterraneorum supra littora, nimirum quantum hæc elevantur & extant supra littorum horizontem, tantum alvei maris infra eum deprimuntur; sive quantum assurgit terra à littoribus versus mediterranea loca, tantundem paulatim magis magisque deprimitur usque ad medii Oceani loca, ubi plerumque maxima est profunditas. That is, From the Depth of the Ocean, as far as hath been hitherto observed in most Places, it is manifest, that that [ Profundity is near equal to the Altitude or Elevation of the Mediterraneous Places above the Shores; that is to say, as much as these are elevated, and stand up above the Horizon of the Shores, so much are the Channels of the Seas depressed below it: Or, as much as the Earth rifeth from the Shores towards the Mediterraneous Places; so much it is by little and little, more and more, depressed to the middle Parts of the Ocean, where the greatest Depth for the most part is.

AND Brerewood, in his Enquiries, pertinently to our Purpose, supposeth the Depth

of the Sea to be a great deal more than the Height of the Hills above the common Surface of the Earth. --- For that in making Estimation of the Depth of the Sea, we are not to reckon and consider only the Height of the Hills above the common Superficies of the Earth, but the Advantage or Height of all the dry Land above the Superficies of the Sea: Because the whole Mass of the Earth, that now appeareth above the Waters, being taken, as it were, out of the Place which the Waters now possess, must be equal to the Place out of which it was taken; and consequently it seemeth, that the Height or Elevation of the one should answer to the Depth or Descending of the other. And, therefore, as I faid, in estimating the Deepness of the Sea, we are not to consider only the Erection of the Hills above the ordinary Land, but the Advantage of all the dry Land above the Sea. Which latter, I mean the Height of the ordinary Main Land, is in my Opinion more in large Continents above the Sea, than that of the Hills is above the Land. For, that the plain and common Face of the dry Land, is not level or equally distant from the Center, but hath great Declivity and Descent towards the Sea, and Acclivity or Rising toward the Mid-Land Part, although it appear not so to the common View of the Eye, is to Reason notwithstanding manifest. Because, as it is found in that Part of the Earth which the Sea covereth, that it descendeth

descendeth lower and lower toward the midst of the Sea; (for the Sea which touching the upper Face of it is known to be level by Nature, and evenly distant from the Center, is withall observed to wax deeper and deeper the farther one saileth from the Shore towards the Main) even fo, in that Part which is uncovered, the Coursings and Streamings of Rivers on all Sides, from the Mid-Land Parts towards the Sea, (whose Property we know is to slide from the higher to the lower) evidently declare so much. \* This Au- \* De fide thor, with Damascen, supposes, that the Un-orthod.1. evenness and Irregularity, which is now seen 2.0.10. in the Superficies of the Earth, was caused either by taking some Parts out of the upper Face of the Earth in fundry Places to make it more Hollow, and laying them in other Places to make it more Convex: Or else (which in effect is equivalent to that) by raising up some, and depressing others, to make Room and Receipt for the Sea; that Mutation being wrought by the Power of that Word, Let the Waters be gathered into one Place, that the dry Land may appear. This Proportioning of the Cavities appointed to receive the Seas, to the Protuberancy of the dry Land above the common Superficies of the Ocean, is to me a sufficient Argument, to prove, that the Gathering together of the Waters into one Place, was a Work of Counfel and Design; and if not effected by the immediate

mediate Finger of God, yet at least govern'd and directed by Him. So the Scripture affirms the Place to receive the Sea, to have been prepared by God, Psal. civ. 8. Now in things of this Nature, to the giving an Account whereof whatever Hypothesis we can possibly invent, can be but meerly conjectural; those are to be most approved that come nearest to the Letter of Scripture, and those that clash with it to be rejected, how trim or consistent soever with themselves they may seem to be: This being as much, as when God tells us how He did make the World, for us to tell Him how He should have made it.

But here it may be objected, That the present Earth looks like a Heap of Rubbish and Ruins; And that there are no greater Examples of Confusion in Nature, than Mountains singly or jointly considered; and that there appear not the least Footsteps of any Art or Counsel, either in the Figure and Shape, or Order and Disposition of Mountains and Rocks. Wherefore it is not likely they came so out of God's Hands; who by the Ancient Philosophers is said αλεί γεωμετρεῖν, and to make all things in Number, Weight, and Measure.

To which I answer, That the present Face of the Earth, with all its Mountains and Hills, its Promontories and Rocks, as rude and deformed as they appear, seems to me a ve-

ry beautiful and pleasant Object, and with all that Variety of Hills, and Valleys, and Inequalities, far more grateful to behold, than a perfectly level Country, without any Rising or Protuberancy, to terminate the Sight: As any one, that hath on the one hand seen the Isle of Ely, or any the like Country exactly level, and extending on all Sides farther than one can ken, or that hath been far out at Sea, where nothing is to be seen but Sky and Water: And on the other, from the Downs of Sussex enjoyed that spacious and ravishing Prospect of the Country on one hand, and the Sea on the other, comparing both Objects, must necessarily confess.

2. THEY are useful to Mankind in affording them convenient Places for Habitation, and Situations of Houses and Villages; serving as Skreens to keep off the cold and nipping Blasts of the Northern and Easterly Winds, and reflecting the benign and cherishing Sun-Beams, and so rendring their Habitations both more comfortable and chearly in Winter; and promoting the Growth of Herbs and Fruit-Trees, and the Maturation of their Fruits in Summer. Besides, casting off the Waters, they lay the Gardens, Yards and Avenues to the Houses dry and clean, and so as well more falutary as more elegant. Whereas Houses built in Plains, unless shaded with Trees, stand bleak and exposed to Wind and Weather:

Weather; and all Winter are apt to be grie-

vously annoyed with Mire and Dirt.

3. A LAND so distinguished into Mountains, Valleys and Plains, is also most convenient for the Entertainment of the various Sorts of Animals, which God hath created, some whereof delight in cold, some in hot, some moist and watery, some in dry and upland Places, and some of them could neither find nor gather their proper Food in different Regions. Some Beasts and Birds we find live upon the highest Tops of the Alps, and that all the Winter too, while they are constantly covered with Snow, as the Iben and Rupicapra, or Chamois among Quadrupeds, and Lagopus among Birds.

4. The Mountains are most proper for the putting forth of Plants; yielding the greatest Variety, and the most luxuriant Sorts of Vegetables, for the Maintenance of the Animals proper to those Places, and for medicinal Uses, partly also for the Exercise and Delight of such ingenious Persons as are addicted to search out and collect those Rarities, to contemplate and consider their Forms and Natures, and to admire and celebrate

the Wisdom of their Creator.

5. All manner of Metals, Minerals and Fossils, if they could be generated in a level Earth, of which there is some Question, yet should they be dug or mined for, the Delfs must necessarily be so slown with Water,

(which

(which to derive and rid away, no Adits or Soughs could be made, and I much doubt whether Gins would suffice) that it would be extremely difficult and chargeable, if possible to work them at all.

- 6. NEITHER are the very Tops of the highest Mountains barren of Grass for the feeding and fattening of Beafts. For on the Ridges of the high Mountains of Jura and Saleve near Geneva, and those of Rhætia, or the Grisons Country, which are the highest of all the Alps, excepting the Vallesian and Sabaudian, there are Multitudes of Kine sed in Summer-time, as I myself can witness, having in my Simpling Voyages on those of Jura and Saleve observed Herds of Cattle there, and many Dairy-Houses built, where I have been more than once refreshed by their Milk, and Milk-Meats. Nay, there are but very few, and those of the highest Summits of the Alps, that keep Snow all Summer: And I was told by the Inhabitants, that one time or other, in seven or eight Years Space, for the most part there came a Summer that melted all the Snow that lay on them too.
- 7. ANOTHER great Use and Necessity of the Mountains and Hills, is for the Generation and Maintenance of Rivers and Fountains, which (in our Hypothesis, that all proceed from Rain-water) could not be without them, or but rarely. So we should have only

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Torrents, which would fail in Summer-time, or any dry Season, and nothing to trust to, but stagnating Water reserved in Pools and Cisterns. Which how great an Inconveni-ence it would be, I need not take Pains to shew. I say, that Fountains and Rivers would be but rare, were there no Mountains: For, upon serious Consideration, I find \* obser- that I was too hasty in \* concluding, because I had observed no Fountains springing up in Plains, therefore there were, or could be, abfolutely none; and do now grant, that there is Reason to believe the Relations made of fuch. For the whole dry Land being but one continued Mountain, and ascending all along from the Sea to the Mid-Land, as is undeniably proved by the Descent of Rivers even in plain Countries; the Water finking into the Earth, may run under Ground, and according as the Vein leads it, break out in the Side of this Mountain, tho' the Place, as to outward Appearance, be a

vat. Physical, &c.

Plain.

I SHALL now add, That the' it be possible that without Mountains there may be Springs, if there should be Rains, (which it is something questionable were there no Mountains, whether there could be or no, at least in hot Countries) yet it is probable, that most of those Springs we find in Plains, or depressed Places distant from Mountains, may come along in fubterraneous Channels

from

from the next Mountains, and there break ont. Monsieur Blundel related to the Parisian Academy, what Device the Inhabitants of the Lower Austria, which is encompassed with the Mountains of Stiria, are wont to use to fill their Wells with Water: They dig in the Earth to the Depth of twenty or five and twenty Foot, till they come to an Argilla [clammy Earth] then they bore a Hole in the midst of a Stone about five or fix Inches broad, and through it bore the Argilla fo deep, till the Water breaks forcibly out; which Water, it's probable, comes from the neighbouring Mountains in subterraneous Channels. And Cassinus observed, That in many Places of the Territory of Modena and Bologna in Italy, they make themselves Wells of springing Water by the like Artifice. They dig in the Earth till they come to the Water (which stagnates in common Wells) which they draw quite out. Then within this new digged Well they make two cylindrical Walls, concentrical one to another; the Space or Interstice between them they fill and ram close with well-wrought Argilla, or Clay, to keep out the ambient Water; which done, they fink the Well deeper into the Ground, and continue the inner Wall so low, till the Earth underneath feems to fwell by the Force of the Water rifing up: And lastly, they bore this Earth or Soil with a long Wimble; whereupon the Water breaks D 4 forth

forth through the Hole with a great Force, fo that it doth not only fill the Well, but overflows and waters the neighbouring Fields with a constant Stream: By this means the same Signor Cassini made a Fountain at the Castle of Urbin, that cast up the Water five Foot high above the Level of the Ground. It is very probable that these Waters descend by subterraneous Passages from the Appennine Mountains, which are about ten Miles distant. If such things may be done by Art, why may they not also by Nature? Nay, that the like are done, we find by Experience, in the Lacus Lugeus, or Zirchnitzer-Sea in Carniola, which after it is empty of Water running out at Holes or Pits in the Bottom, (which it doth yearly in the Summer-time, in the Months of May, June, and July) in the Autumn, when it rains moderately, the Water spouts out of some of the forementioned Pits two or three Fathoms perpendicularly; but when it rains very hard and long together, especially with Thunder, then the Water breaks forth with great Force, not only from the foresaid Pits, but likewise at a thousand other Caves and Holes, spirting feveral Fathoms high, from some perpendicularly, from others obliquely, fo that there is not a pleafanter Sight than this, and in a short time fills the Lake. A full Description, and an Account of all the Phanomena of this admirable Lake, see in Philosoph. Transact. Numb.

Numb. 191. p. 411, &c. So we see, Water may be brought down from the Mountains, and raised up naturally in strait Channels, with that Force, and to that Height, as to exceed all the artificial Jets in the World, if not in the Altitude of the Spout, yet in the

Bigness of the Stream abundantly.

As for the Wells about Modena, because wheresoever you dig about that City for some Miles, at the Depth of 63 Foot you meet with Water under such a Bed of Argilla, which spouts up, and rises as high, and higher than the adjacent Country; I guess there is a subterraneous Lake, whose Waters are compressed between, perhaps, the Sea or fresh Water on one hand, which sorces them upward, and the Bed of Argilla on the other, which keeps them down; which Bed, when it is bored through, they rush upwards, qua data porta, with great Force, and fill the new digged Well. This I propose as Conjecture not altogether improbable.

This End and Use of Mountains, I find affigned by Mr. Halley, in his Discourse concerning the Original of Springs and Rivers, in these Words: This, if we may allow final Causes (and why may we not? what needs this Heitancy and Dubitation in a thing that is clear?) seems to be the Design of the Hills, that their Ridges being placed through the midst of the Continents, might serve, as it were A-

lembicks,

lembicks, to distill fresh Water for the Use of Man and Beast, and their Heights to give a Descent to those Streams to run gently, like so many Veins of the Macrocosm, to be the more

beneficial to the Creation.

Bur some may say, Granting there be some Use and Benefit of moderate Hills and Risings; what necessity is there of such extended Ridges of vast and tow'ring Mountains, hiding their Heads among the Clouds, and seeming for Altitude to contend with the Skies? I answer, There is very great Use of them, for repelling the Vapours exhaled by the Sun-beams in the hot Regions, and hindring their Evagations Northward, as we have already shewn, and shall not repeat. I might

add hereto,

8. Those long Series and Chains of Mountains are of great Use for Boundaries and Limits to the Territories of Princes or Commonwealths, to secure them on those Parts from sudden Incursions of Enemies. As for the Rudeness and Confusion of Mountains, their cragged and broken Rocks and Cliffs, and whatever other Disorder there may be among them, it may be accounted for, from the Manner of their first Generation, and those other Mutations they have been since obnoxious to, by Earthquakes, Eruptions of Vulcano's, foundering and falling in of their Props and Foundations, and by Time and Weather too, by which not only the Earth

is washed away, or blown off from the Stones, but the very Stones and Rocks them-felves corroded and dissolved, as might eafily be proved by Instances, could I spare time to do it.

To sum up all, relating to the Division and Disposition of the Water and Earth, in

brief.

- r. Is any, the Water being the lighter Element, doth naturally occupy the upper Place, and stand above the Earth; and so at first it did. But now, we see, it doth not so; the Earth being, contrary to its Nature, forcibly elevated above it; being (as the Psalmist phraseth it) founded above the Seas, and established above the Floods; and this, because it was best it should be so, as I shall clearly prove and deduce in Particulars in another Discourse.
- 2. The dry Land is not elevated only upon one Side of the Globe; for then, had it had high Mountains in the middle of it, with fuch vast empty Cavities within, as must be equal to the whole Bulk raised up, the Center of Magnitude must needs have been considerably distant from the Center of Gravity; which would have caused a very great and inconvenient Inequality in the Motion of the Parts of the Earth: But the Continents and Islands are so equally dispers'd all the Globe over, as to counterb. Lince one another;

another; so that the Centers of Magnitude

and Gravity concurr in one.

3. THE Continents are not of exactly equal and level Superficies or Convexity. For then, the Parts subject to the Course of the Sun, called the Torrid Zone, would have been, as the Ancients fancied them, unhabitable for Heat and Drought. But there are huge Ridges and extended Chains of lofty Mountains directed, for the most part, to run East and West; by which means, they give free Admittance and Passage to the Vapours, brought in by the Winds from the Atlantick and Pacifick Oceans; but stop and inhibit their Excursions to the North and South, either condensing them upon their Sides into Water, by a kind of external Destillation; or by streightning and constipating of them, compelling them to gather into Drops, and descend down in Rain.

THESE are great things, and worthy the Care, Direction, and Disposal of the Great and Wise Creator, and Governor of all things: And, we see, they are accordingly excellently ordered and provided by Him.





### CHAP. IV.

# Of the Creation of Animals; Some Questions resolved.



S to the first Creation of Animals, I have already proposed two Opinions, both consonant or reconcileable to the Scri-

ptures.

I. THAT GOD Almighty did at first create the Seeds of all Animals, (that is, the Animals themselves in little) and dispers'd them over the superficial Part of the Land and Water, giving Power to those Elements to hatch and bring them forth; which when they had done, and all the Animals of these created Seeds were produced and perfected, there remained no more Ability in them to bring forth any more; but all the succeeding owe their Original to Generation.

2. BECAUSE some will not admit that GOD at first created any thing impersect, we did propose that He might, by His Almighty Power, out of the Water and Earth, make the first Sett of Animals in their full State and Persection, (as it is generally believed He did Adam) and give to each Species a Power by Generation to propagate their Like. For, His commanding the Waters and Earth to pro-

duce

duce such and such living Creatures, signifies that He did Himself essicaciously form them out of the Earth and Water; as when He saith, Let there be Light, &c. the Meaning is not, that He did permit or command fomething else besides Himself, to produce Light; but that He did, by His own Almighty Power, effectually create it. Indeed, the Scripture doth in this manner interpret itfelf: For, whereas it is faid, verfes 20, and 24. Let the Waters bring forth, &c. and, Let the Earth bring forth the living Creature, &c. In the next Verses it follows, And Go D created great Whales, and every living Creature that moveth, &c. And God made the Beast of the Earth, &c. But now there may a farther Question or two be moved, concerning the Creation of Animals.

1. WHETHER GOD created, at first, a great Number of every Kind of Animal all the Earth over, in their proper Places and Climates; or only of two of each Species, a . Male and a Female, from which all the rest proceeded by Generation? This latter Opinion I find embraced by fome modern Philosophers, and it may be made probable by feveral Arguments.

First, From the Analogy to Mankind. There being, at first, only one Man and one Woman created; it is very likely, there were no more of any other Creatures, two being

being sufficient, in a short time, to stock the World.

Secondly, Because, at the time of the General Deluge, there were only two of each Kind (of unclean Beasts) preserved in the Ark: And if two might thence suffice, why not as well at the first Creation? And if there were no need of creating more, what likelihood that there were more created?

But the first Opinion, That there were many at first created, seems more consonant to Scripture; which, in the Mention of the Creation of Aquatic Creatures, useth the Word Abundantly, Gen. i. 20. And God said, Let the Waters bring forth abundantly the moving Creature that bath Life, and Fowl that may fly above the Earth, in the open Firmament of Heaven. And, in the next Verse it is said, That the Waters did bring them forth abundantly. So that, at least, of Birds and Fishes, there were many Individuals at first created. As for Plants, certain it is, that they were created dispersedly all the World over; they having no locomotive Power, but being fix'd to a place, and the Seeds of many of them being ponderous, and not portable by Winds, or any other Means, and yet those of the same Species to be found in far distant Places, and on the Tops of high Mountains, as remote from each other, as the Helvetick and Austrian Alps. 2. Con-

2. Concerning the Creation of Animals, there may yet a farther Question be moved, viz. Whether all Animals that already have been, or hereafter shall be, were at first actually created by Goo? or, Whether hath He given to each Kind of Animal such a Power of Generation, as to prepare Matter, and produce new Individuals in their own Bodies? Some are of Opinion, that God did Himself, at first, actually create all the individual Animals that ever were, or ever shall be; and that there is no fuch thing as any Productions of new ones. For, fay they, What were that, but a Creation of fuch Individuals? And, what did God at the first Creation, more than, if this be true, we fee every day done, that is, produce a new Animal out of Matter, which itself prepares? All the Difference is, the doing that in an Instant which the Creature must take Time to do. For, as for the Preparation of Matter, that must be made fit, be the Agent never fo Omnipotent.

Besides, the Animal-Parent cannot be the Agent or Efficient in the Generation, or Forming and Nourishing of the Fatus. Because that is a Work of Art and Reason, which brute Creatures are not endued withall; nor, indeed, doth Man himself understand any thing of the Process of Generation in himself, neither is conscious of what

is done in the Womb; so far is he from be-

ing the Doer of it.

AGAIN, it is most probable, if not certain, that most Animals have in them, from the Beginning, the Seeds or Eggs of all the Young they shall afterward bring forth, which when they are spent and exhaust, the Creature becomes barren, or effete. So we see all the Female Fatus of viviparous Quadrupeds are brought forth with their Testes, or Ovaria in them, which are esteemed Parts of their Bodies; and all Birds have in them, from their first Formation, their Ovary or Egg-cluster, containing the Seeds of all the Eggs they shall ever lay. Now, had the Creature a Power of producing new ones, what need was there that there should be so many at first formed in them? And, why might they not breed them as well afterwards, as at the beginning?

HEREUPON these Philosophers argue thus: Suppose we, that Goddid at first create two Animals, a Male and a Female: The Female must be created with its Ovaries or Testes, which (as we said) contained so many Seeds or Eggs as the Creature should ever bring forth Young. So it is clear, that not only the first Pair, but the first Generation of Animals, were actually created. Again, this first Generation, from their first Appearance, had each of them (the Females I mean) its Ovaria, or Clusters of Eggs, every one where-

of had, in like manner, its Animalcule in it; fo that this fecond Generation was also created in the first. The same may be demonstrated of the third and fourth; and so on, of all the Generations that shall be as long as the World lasts.

AGAINST this Doctrine it may be obje-Eted, First, That it seems impossible that the Ovaries of one Female should actually include and contain the innumerable Myriads of Animals that may proceed from it in so many Generations, as have been and shall be during the Continuance of the World. Who can conceive such a small Portion of Matter to be capable of fuch Division, and to con-

tain such an Infinity of Parts?

But to this it may be answered, That our Sight doth not give us the just Magnitude of Things, but only their Proportion; and what appears to the Eye as a Point, may be magnified so, even by Glasses, as to discover an incredible Multitude of Parts; nay, some Animals there are, so small, that if a Grain of Sand were broken into 8000000 of equal Parts, one of these would not exceed the bigness of one of those Creatures, as Mr. Lewenhoek affirms. And Dr. Hook proceeds farther, and fays, that he had difcovered some so exceeding small, that Millions of Millions might be contained in one Drop of Water. If these whole Greatures be so incredibly little, what shall we think

of

of their Parts containing and contained, their Entrails and Muscles, their Ovaries and Eggs? But for a sensible Demonstration of the Unconceivable, I had almost said Infinite, Divifibility of Matter, I might referr the Reader to the Honourable Mr. Boyle, of famous Memory, his Discourse concerning the strange Subtilty of Effluviums. I shall mention one or two Experiments. 'He dissolved one Grain of filed Copper in Spirit of Salt-Ar-'moniack, and, upon this Solution, he poured ' fo much distilled Water by degrees, as till the fair and deep blue Colour grew fomewhat pale, without being too dilute to be manifest: And then carefully weighing the 'Vessel and the Water, and subducting the Weight of that out of this, he found the Weight of the Liquor alone, when reduced to Grains, to amount to 28534; so that a Grain of Copper communicated a Tincture to 28534 times its Weight. Now, consider-ing that the Weight of Copper to the Weight of Water of the same Bulk, is proexime as 9 to 1, a Grain-weight of Copper is in bigness but the ninth part of as much Water as weighs a Grain; and so the foremerly mentioned Number of Grains of Water must be multiplied by 9, to give us the Proportion between the tinging Body and tinged Liquor; whence it will follow, that 'a single Grain of Copper gave a Blueness to above 256806 Parts of limpid Water,

cute this Experiment farther, he mixt together equal Parts of distilled colourless Water, and of the said tincted Liquor, and found, that though the Colour was very faint and dilute, yet an attentive Eye could easily discern it to be bluish; whereby it appears, that one Grain of Copper was able to impart a Colour to double the Quantity of Water above-mentioned, that is, to

513612 Grains of Water.

OTHER Experiments there are, in the fame Discourse, made in odorate Bodies: 'Having, saith he, for Curiosity-sake, suffered in a Pair of exact Scales, that would turn with a very small Part of of a Grain, a Piece of Ambergreece bigger 'than a Walnut, and weighing betwixt a hundred and fixfcore Grains, I could not in three days and a half, that I had Opporfunity to make the Trial, discover, even upon that Balance, any Decrement of Weight ' in the Ambergreece, though so rich a Perfume lying in the open Air was like, in ' that time, to have parted with good store of odoriferous Steams: And, a while after, fuspending a Lump of Asafatida five days and a half, I found it not to have sustained any difcernible Loss of Weight, though, in 's fpight of the unfavourable cold Weather, it had about it a neighbouring Atmosphere, replenished with fœtid Exhalations, &c. Bur

But what can be imagined more small and fubtil, than the minute Parts of the Steams of Animals? The same Author, in the fame Tract, tells us, 'That a good Set-ting Dog, by his way of Ranging the Fields, and his other Motions, especially of his Head, would not only intimate the Kinds of Game, whose Scent he chanced to light upon, but would discover where Partridges had been (though, perhaps, without staying in that Place) feveral hours before." He farther tells us, 'That a very fober Gentleman of his Acquaintance, who had often occasion to employ Blood-hounds, assured him, that if a Man had but passed over the Field, the Scent would lie, so as to be perceptible enough to a good Dog of that fort, for feveral hours after. And an ingenious Hunter likewise assured him, 'That he had observed, that the Scent of a flying and hunted Deer, will sometimes continue upon the Ground from one Day to the next 'following." He proceeds farther; 'And 'now we may consider these three things; First, That the Substance left upon the Ground by the transient Tread of a Partridge, Hare, or other Animal, that doth but pass along his Way, does probably communicate to the Grass or Ground but some of those Effluxions that transpire out of his Feet, which being small enough to escape the Eye, may probably not amount to one E 3

Grain in Weight, or perhaps not to the 'Tenth Part of it. Next, That the Parts of fluid Bodies, as fuch, are perpetually in Motion, and so are the invisible Particles that fwim in them, as may appear by the Dissolution of Salt or Sugar in Water, and the Wandring of aqueous Vapours through the Air, even when the Eye perceives them onot. And, Thirdly, That though the Atmosphere of one of these small Parcels of the exhaling Matter we are speaking of, may oftentimes be exceeding vast in com-' parison of the emittent Body, as may be guessed by the Distance, at which some Set-ters or Bloodhounds will find the Scent of a Partridge or Deer; yet, in Places exposed to the free Air or Wind, 'tis very likely that these Steams are assiduously carried away from their Fountain, to maintain the forementioned Atmosphere, for six, eight, or more hours; that is, as long as the Scent hath been observed to lie, there will be requisite a continual Recruit of Steams succeeding one another. And that so very small a Portion of Matter, as that which, we were flaying, the Fomes of these Steams may be ' judged to be, being fensibly to impregnate an Atmosphere incomparably greater than itself, and supply it with almost continual Recruits, we cannot but think, that the Steams it parts with, must be of extreme and scarce conceivable Minuteness." So far

the Author. To which I shall add, That by the Steams, I suppose, he means the minute Particles of which the Steams are compounded. Now these minute Particles themselves must be compound Bodies, because they affect the Sense in a particular manner, so that a fagacious Creature can distinguish by them, not only Species but Individuals; as a good Dog, by the Foot, will find out his Master, though not only several other Creatures, but several Men have passed that way: Unless we will groundlessly affirm, that those Particles are the minima Naturalia, and that the Creature discerns them by their Figure, or their different manner of Motion.

A SECOND Objection of Brunnerus (as I find him quoted in Peyerus his Merycologia) is this: Si cuncta Animalium membra jam formata existant in ovo, &c. 'If all the Members of Animals, already formed, do exist in the Egg, though for their Smalness they escape our fight; I cannot conceive, ' how by the Force of Imagination alone, in a pregnant Woman, can be produced fometimes Calves-heads, or Feet, sometimes a Dog's Face, or other monstrous ' Members; these Productions being a cerc tain and experimental Proof, that the Parts ' and Members of Animals are formed and delineated originally in the Womb, or Egg. E 4

To

To this, Peyerus replies: 'Who then forms? who delineates fuch Monsters? Shall we accuse God the Creator? But "He is just, and doth not make enormous ' things: Or, Will you blame Nature? that is, the constant Order and Will of God, which never is deficient? Will you lay the fault upon the plastick Vertue or Power residing in the Womb or Seed, and acting those things? But that is a Chima-' ra; it is nothing, it is an Idol. There remain Two Things to which the Cause ' may justly be imputed; the Imagination of ' the Mother, which may and doth often-' times effect wonderful things in the Body of the tender Embryon; and the Devil. If ' you refuse to admit the former, you are obliged to accept the latter. And, truly, the Devil may, God so permitting, many ways abuse Men, and transfigure the Young in the Womb, to punish the wicked and e nefarious Actions of degenerate Mankind, ' indulging themselves in obscene Imaginations, or preposterous and unnatural Impurities and Pollutions. But do these Errors and Enormities take away the Order of Nature? By no means: For, from what is rare and extraordinary, and feldom happens, there is no Consequence to be drawn. For though Monsters are some-' times born, nothing hinders but that we may still think, that the Ideas of the feveral Fætus may be præexistent and latent in the Eggs; and the Event may teach us, that those *Ideas* or *Embryos* may, by a vio-

' lent Cause, be marred and deformed in

the Womb; as Wax, though it be alrea-dy figured, while it is foft, is easily al-tered, and capable of receiving new Im-

pressions.

But against this, Answer we may thus plead in Defence of Brunnerus: As to what is faid of the Devil, it feems to be but a Shift or Refuge to have recourse to, when we are at a Loss, and pinch'd with an Argument; as in the ancient Stage-plays, when they were put to a plunge, they were forced to bring in some θεὸς ἀπὸ μηχανής to help them out. And as for the Imagination of the Mother, strange it is, that that should have any Influence at all upon the Formation of the Fætus; the Mother not knowing any thing that's done in the Womb; nor being conscious to herself of any Power to form or act any thing there: The Fætus being an external thing to her, and no more a Part of her, than an Egg is of the Hen that sits upon it, affording nothing to it but Warmth and Nourishment. And we see, Eggs may be hatched by the artificial Heat of an Oven, without the Incubation of a Hen. But granting, that the Imagination of the Mother may transform the Fatus, why may it not as well originally form it out of prepared

pared Matter? and then, what need of an Idea or minute Animalcule in the Seed? But whatever may be faid of Men, how come Monsters in Brutes, which, according to Peyerus, are meer Machines, and have no

Imagination or Perception at all?

Bur not to lead the Reader into a Maze or Labyrinth, and leave him there; for my own part, I must confess, that the Argument for the Præexistence of the Fatus's, or their Creation from the Beginning, taken from the due Number of Eggs that are in every Female from her first Formation, and her being effete after they are spent, weighs very much with me, as I know not how to quit myself of it. And on the other hand, if those Stories concerning Dogs and Serpents, &c. found in the Wombs of Women be true (which are well attested) I acknowledge it very difficult to give an Account, how those Animals came to be bred or formed there. But I had rather confess my Ignorance of the Manner of the Production of fuch præternatural and extraordinary things, than to permit it to have fuch Influence upon me, as to remove me from fo wellgrounded an Opinion concerning the ordinary Production of Animals in a natural Way.

But notwithstanding all I have said, in Defence of the Creation of the Individuals of all Animals at first, because the inconcei-

vable

vable Smalness of the last Races of Animals make it incredible, I shall be content to let it pass for a Conjecture, and not insist far-

ther upon it.

The Being of a Plastick Nature, subordinate to God, notwithstanding Peyerus makes an Idol of it, and charges those with Idolatry who do believe it, I am not afraid to admit: My Reasons for which, I have given in another \* Discourse, and shall not here \* Wisdom for the standing of the s

repeat.

THE new Opinion of Mr. Lewenhoek, that tion. all Animals proceed from an Infect or Animalcule in the Male-sperm, I think I have fufficiently confuted in my Book, Entituled, Synopsis methodica Animalium Quadrupedum, pag. 37. & seqq. to which I referr the Reader: Only I shall repeat, that I am less inclinable to it, because of the necessary Loss of an incredible Multitude of them, which feems not agreeable to the Wisdom and Providence of Nature. For, supposing every Male hath in him all the Animalcules that he shall or may eject; they may, for ought I know, amount to Millions of Millions, and fo the greatest part of them must needs be lost. Nay, if we take but one Coit, there must, in uniparous Creatures at least, abundance be lost. But if we suppose the Fatus to be originally in the Egg, it is not fo. For the Eggs of all forts of Creatures are so proportioned to the Nature of the Animals, the Time

\* Wisdom
of God in
the Crea-

## Of the Chaos, &c.

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Time that they live, the Time and Number of their Gestations, and the Number they bring forth at all times, that they will much about suffice for the Time the Creatures are sit to breed and nourish their Young: So that they may, if need be, be all brought forth, and come to Perfection.

The End of the First Discourse.





## DISCOURSE II.

Of the general Deluge in the Days of Noah, its Causes and Effects.



PROCEED now to say something concerning the General Deluge in the Days of Noah; which was also a Matter of ancient Tradition. I shall not

enlarge much upon it, so as to take in all that might be said, but confine myself to Three Heads. 1. I shall confirm the Truth of the History of the Deluge recorded in the Scripture, by the Testimonies of some ancient Heathen Writers. 2. I shall consider the Natural Causes or Means whereby it was effected. 3. I shall enquire concerning the Consequences of it, what considerable Effects it had upon the Earth.

CHAP.



#### CHAP. I.

Testimonies of Ancient Heathen Writers concerning the Deluge.



IRST then, I shall produce some Testimonies of Ancient Heathen Writers concerning the De-

then Writers concerning the Deluge. THE first shall be those of Berosus, recorded by Josephus. The first, in his first Book against Appion, where he tells us, 'That Berosus, following the most ancient Writings, relates the same things with Moses concerning the great Deluge, and the Deftruction of Men by it; and of the Ark, in which Nochus, the Author of our Stock, was preserved, after it rested on the Tops of the Armenian Mountains." And the fecond, in the fifth Chapter of his first Book of Jewish Antiquities; Βηρωσσός ὁ Χαλδαίος διαγέμενος τὰ περὶ τὸν ματακλυσμὸν, ἔτω πε διεξίεισι, &c. That is, 'Berosus the Chaldaan, 'relating the Story of the Deluge, writes thus: It is reported, that there is some part of ' the Vessel [the Ark] still remaining at the ' Mountain of the Gordyaans; and that certain Persons scraping off the Bitumen, or Pitch, carry it away; and that Men make

use of it for Amulets, to drive away Discases.

A SECOND Testimony the same Fosephus affords us in the same Place, and that is, of Nicolaus Damascenus; 'who, saith he, gives us the History [of the Ark and Deluge] in these Words: About Minyas in Armenia, ' there is a great Mountain called Baris, to ' which it is reported, that many flying, in the time of the Deluge, were faved; and that a certain Person was carried thither in an Ark, which rested on the Top of it; the Reliques of the Timber whereof were preferved there a long time." Besides these, Fosephus tells us in the same Place, that Hieronymus the Egyptian, who wrote the Phanician Antiquities, and Mnaseas, and many others, whose Words he alledges not, make mention of the Flood.

EUSEBIUS superadds two Testimonies more; the one of Melon, to this Essect: There departed from Armenia, at the time of the Deluge, a certain Man, who together with his Sons had been saved; who being cast out of his House and Possessions, was driven away by the Natives. This Man passing over the intermediate Region, came into the mountainous Part of Syria, that was then desolate." This Testimony makes the Deluge Topical, and not to have reached Armenia.

THE other is of Abydenus an ancient Writer, set down by Eusebius, Præpar. Evangel. lib. 9. cap. 4. Μεθ' ον άλλοι τε ἦρξαν, καὶ Σείσι- θρος, ὧ δὴ Κεόνος πεθσημαίνει μεν ἔσεσθαι πλῆθος όμβρων Δεσίε πέμπτη έπὶ δένα, &c. ' After whom others reigned, and then Sifithrus, (fo he calls Noah.) To whom Saturn foretold, that there should be a great Flood of Waters upon the fifteenth Day of the Month Desius; and commanded him to hide all Writings for whatever was committed to writing in 'Heliopolis of the Syparians: Which so soon as Sisithrus had performed, he presently sailed away to Armenia, where what God had pre-' dicted to him, immediately came to pass, for came upon him.] The third Day after the Waters ceased, he sent forth Birds, that he 'might try whether they could espy any Land uncovered of Water: But they finding nothing but Sea, and not knowing whither to betake themselves, returned back to Sistbrus. 'In like manner, after some Days, he sent out others, with like Success. But being sent out the third time, they returned with their Feet fouled with Mud. Then the Gods 'caught up Sisithrus from among Men; but the Ship remained in Armenia, and its Wood ' afforded the Inhabitants Amulets to chase away many Diseases." These Histories accord with the Scripture as to the main, of the Being of a Flood, and Noah escaping out of it;

only they adulterate the Truth, by the Ad-

mixture of a deal of fabulous Stuff.

Cyril, in his first Book against Julian, to prove the Deluge, alledges a Passage out of Alexander Polyhistor, consonant to the preceding Words of Abydenus. 'Plato himself' (faith he) gives us an obscure Intimation of the Deluge, in his Timaus, bringing in a certain Egyptian Priest, who related to Solon out of the Sacred Books of the Egyptians, that before the particular Deluges known and celebrated by the Grecians, there was of old an exceeding great Inundation of Waters, and Devastation of the Earth, which seems to be no other than Noah's Flood.

PLUTARCH, in his Book De Solertia Animalium, tells us, 'That those who have written of Deucalion's Flood, report, that there was a Dove sent out of the Ark by Deucalion, which returning again into the Ark, was a Sign of the Continuance of the Flood, but slying quite away, and not returning any more, was a Sign of Serenity, and that the Earth was drained.

INDEED, Ovid, and other Mythologists,' make Deucalion's Flood to have been universal: And it's clear, by the Description Ovid gives of it, that he meant the general Deluge in the Days of Noah. And that by Deucalion, the Ancients, together with Ovid, understood Noah, Kircher, in his \* Arca Noa, \*L.2.6.6.

doth

F

# Consequences of

doth well make out. First, For that the Poet Apollonius makes him the Son of Prometheus, in his third Book,

Ταπετιονίδης ἀγαθον τέμε Δευμαλίωνα:

where Prometheus, the Son of Japetus, begat the renowned Deucalion. 2. Berosus affirms Noah to have been a Scythian: And Lucian, in his Book De Dea Syria, tells us, that many make Deucalion to have been so too. 3. The Scripture testifies, that Men were generally very corrupt and wicked in the Days of Noah. And Andro Teius, a very ancient Writer, testifies, that in Deucalion's time there was a great abundance of wicked Men, which made it necessary for God to destroy Mankind. 4. The Scripture saith, That Noah was a just Man, and perfect in his Generation. And Ovid saith of Deucalion, that,

Non illo melior quisquam, nec amantior æqui Vir fuit, aut illa [Pyrrha uxore ejus] reverentior ulla Deorum.

And a little after,

Innocuos ambos, cultores numinis ambos.

5. Apollonius faith of Deucalion, Πρῶτος ἀνθρώπων ἐβασίλευσε, He first ruled over Men. Which may very well be attributed to Noah, the Father and Restorer of Mankind, whose Right

Right the Kingdom was. 6. The fending out of a Dove, to try whether the Waters were abated, and the Flood gone off, is (we have feen) by Plutarch attributed to Deucalion. 7. Lucian, in his Timon, and in his Book De Dea Syria, sets forth the Particulars of Deucalion's, after the Example of Noah's Flood. Δευκαλίων ή μενος ανθρώπων ελίπετο είς γενεήν δευτέραν έυβελίης τε καὶ τε ἐυσεβέος ένεκα, &c. Deucalion was the only Man that was left for a second Generation, for his Prudence and Piety sake; and he was saved in this manner: He made a great Ark, and got aboard it, with his Wife and Children: And to him came Swine, and Horses, and Lions, and Serpents, and all other living Creatures, which the Earth maintains, according to their Kinds, by Pairs; and he received them all, and they hurt him not; for there was, by Divine Instinct, a great Friendship among them; and they sailed together in the Ark, so long as the Waters prevailed. And, in his Timon, he saith, That Noah laid up in the Ark Plenty of all Provifions for their Sustenance.

PLINY faith of the City of Joppa, that it

was built before the Flood.

By all this it appears, that the Notion of a general Flood was every where current among the People, especially in those Countries where the Ark rested, and where Noah afterwards lived. And hence it was, that the Apameans, whether of Mesopotamia, or Syria,

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or Bythinia, (for there were three Cities of that Name) coined Moneys in Honour of the Emperors Septimius Severus, and Philippus Arabs, having on the Reverse the Figure of an Ark, with a Man and a Woman standing before it; and two Doves above it, one flying with a Branch of a Tree in its Mouth, another resting upon it. The Figures whereof, and a learned Discourse thereupon out of Falconerius, may be seen in Kircher's \*L.2.c.6. \* Arca Noa. Which Moneys, though they were coined long after our Saviour's Time, and the Divulgation of the Scriptures; yet being done by Ethnicks, do shew that the Story of the Deluge was known, and famous, and generally credited among them, as being near the Place where Noah lived and conversed after the Flood.

HOWBEIT I do not deny, that there was fuch a particular Flood in Thessaly, as they call Deucalion's, which happened seven hundred and seventy Years, or thereabouts, after the general Deluge. I acknowledge also a more ancient Flood in Attica, in the Time of Ogyges, about two hundred and thirty Years before Deucalion's, by which the Country was so marred, that it lay waste and uncultivated, without Inhabitants, for almost two hundred Years.



TAB I.

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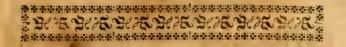
The two ancient Apamian Coyns taken out of Octav. Falconieri de Nummo Apamensi Deuca lionæi Diluvij typum exhibente 8th. Romæ.





By the Greek inscriptions they were stamp under Philippus Marcus Aurelius Alexander and Septimius Severus





## CHAP. II.

## Of the Causes of the Deluge.



HAT were the instrumental Causes or Means of the Flood? Whether was it effected by natural or supernatural Means only? Whether was God no farther concerned in it, than

in fo ordering Second Causes at first, as of themselves necessarily to bring it in at such a

time?

FIRST, Those that hold this Deluge was altogether miraculous, and that God Almighty created Waters on purpose to serve this Occasion, and, when they had done their Work, destroy'd them again, dispatch'd the Business, and loose or cut the Knot in a few Words. And yet this Hypothesis is not so absurd and precarious, as at first Sight it may feem to be: For the World being already full, there needed not, nor indeed could be any Creation of Water out of nothing, but only a Transmutation of some other Body into Water. Now, if we grant all Natural Bodies, even the Elements themselves, to be mutually transmutable, as few Men doubt, and some think they can demonstrate; why might not the Divine Power and Providence

bring

bring together at that time such natural Agents, as might change the Air, or Æther, or both together, into Water; and so supply what was wanting in Rains, and extraordinary Eruptions of Springs. To them that argue the Improbability of such a Change, from the great Quantity of Air requisite to the making of a little Water; it may be answered, That if Air, and all Bodies commixt with it, were together changed into Water, they must needs make a Bulk of Water of equal Quantity with themselves, unless we will grant a Peripatetical Condensation and Rarefaction; and hold that the same Matter may have sometimes a greater, sometimes a lesser Quantity or Extension.

To this may be replied; If, indeed, the whole World were full of Body or Matter, a Deluge might easily be effected this way: It were but converting the Air and other Bodies mixt with it round the Terraqueous Globe, to the Height of 15 Cubits above the highest Mountains into Water, and the Busi-

ness were dispatch'd.

But there is another Being in Nature befides Matter or Body, viz. a Vacuum, or empty Space, which is intermix'd with the minute Parts of all Bodies. Those that have more of it interspers'd among their Parts, are more rare or thin; and those that have less, more dense or thick; the rarer Bodies are also lighter, the more dense heavier, according according to the Proportion of Matter they contain. Hence perchance a cubical Foot of Air may not be equal in Weight to the hundredth Part of a cubical Foot of Water; and confequently, an hundred cubical Feet of Air will be requisite to make, by Conversion, one cubical Foot of Water. I take it for granted here, that the different Weight of Bodies depends upon the Difference of Matter they contain, so that those which have fewest empty Pores are the heaviest, those

that have most, the lightest.

THIS Cause [the Conversion of Air into Water] the Learned Jesuite Athanasus Kircher, in his Book De Arca Noa, alledges as the undoubted instrumental Cause or Means of the Deluge, in these Words; Dico totum illud aëreum spatium usque ad supremam regionem aëris, præpotentis Dei virtute, in aquas, per inexplicabilem nubium coacervatarum multitudinem, quâ replebatur, conversam esse cujus ubertas tanta suit, ut Aer supremus cum inferiori in Oceanum commutatus videri potuerit, non naturæ viribus, sed illius cujus voluntati & imperio cuncta subsunt. That is, I affirm, that all that Aëreal Space that reaches up to the supreme Region of the Air, was, by the Power of the Omnipotent God, and Instrumentality of an inexplicable Multitude of Clouds amassed together, wherewith it was filled, changed into Water, so that the upper and lower Air might seem to be transmuted into

\* Arca

C. 4.

into an Ocean, not by the Strength of Nature, but of Him to whose Will and Power all things are subject. And he is so confident \* that Noz, 1.2. this Deluge; in which the Water was raised fifteen Cubits above the highest Mountains, was not, nor could be effected by natural. Causes, but by the Right Hand of the most High God only; that he faith, 'No Man can deny it, but he who doth hot penetrate. how far the Power of Nature can extend, and where it is limited." To conclude, this Hypothesis hath the Suffrages of most learned Men. But, because the Scripture, assigning the Causes or Means of the Inundation, makes no Mention of any Conversion of Air into Water, but only of the Breaking up the Fountains of the Great Deep, and the Opening of the Windows of Heaven, I suppose those Causes may be sufficient to work the Effect, and that we need not have recourse to fuch an Assistance.

As for those that make the Deluge Topical, and restrain it to a narrow Compass of Land, their Opinion is, I think, sufficiently \*Dr.Bur. confuted by a late ingenious \* Author, to

whom, therefore, I referr the Reader. net.

I SHALL not undertake the Defence or Confutation of those, or any other Hypothesis; only tell you which, at prefent, feems to me most probable; and that is theirs, who for a Partial Cause of the Deluge, assign either a Change of the Center of the Earth, or a violent Depression of the Surface of the Ocean, and a Forcing the Waters up from the subterraneous Abysis through the Channels of the Fountains that were then broken up and o-

pened.

FIRST then, let us consider what Causes the Scripture assigns of the Flood; and they are two. 1. The Breaking up the Fountains of the great Deep. 2. The Opening of the Windows of Heaven. I shall first treat of this last. By the Opening of the Windows of Heaven, is (I suppose) to be understood the Causing of all the Water that was sufpended in the Air to descend down in Rain upon the Earth; the Effect hereof here mentioned being a long continuing Rain of forty Natural Days; and that no ordinary one neither, but Catarracts or Spouts of Water; for so the Septuagint interpret the Windows of Heaven were opened. Kai ai натарранта тв έρανε ήνεώχθησαν. The Catarracts or Spouts of Heaven were opened. And that these Treafuries of the Air will afford no small Quantity of Water, may be made appear, both by Scripture and Reason. 1. By Scripture, which opposes the Waters that are above the Heavens or Firmament, to those that are under them; which if they were not ισόρροπα, and in some Measure equal, it would never do. Gen. i. 6. God is said to make a Firmament in the midst of the Waters, and to divide the Waters which were under the Firmament.

ment, from the Waters which were above the Firmament. And this was the Work of a whole Day, and consequently no inconsiderable thing. 2. The same may be made appear, by Reason grounded upon Experience. I myself have observed a Thunder-Cloud in Passage, to have in less than two Hours Space. poured down fo much Water upon the. Earth, as, besides what sunk into the parched and thirsty Ground, and filled all Ditches and Ponds, caused a considerable Flood in the Rivers, setting all the Meadows on float. FAnd Dr. Wittie, in his Scarborough Spaw, tells us of great Spouts of Rain that ordinarily fall every Year, some time or other, in Summer, that fet the whole Country in a Flood. Now had this Cloud, which might, for ought I know, have moved forty Miles forward, stood still and emptied all its Water upon the same Spot of Ground it first hung over, what a fudden and incredible Deluge would it have made there? and yet what Depth or Thickness of Vapours might remain uncondensed in the Air above this Cloud, who knows? That the Ocean afforded but little, appears in that the Vapours raifed out of it, and brought up in Clouds, and poured down upon the Earth in Rain, are shortly carried off by the Rivers, and reassumed into the Sea: But if the Waters of the Flood encompassed the whole Terraqueous Globe, (as is most probable) then the Ocean

Ocean contributed nothing; for the Water must be raised higher above the Superficies of the Ocean, than that of the dry Land; upon which yet, at the end of the forty Days Rain, the Waters were so high as to bear up the Ark, that it touched not the Ground.

MOREOVER, after this forty Days violent and impetuous Rain, it is probable, that it rained, though more gently and interruptedly, till the 150th Day, because till that time the Waters prevailed and encreased upon the Earth. All this Water that fell in Rain, must be contained in the vast Treasuries of the Middle and Superior Air, or else

immediately created by Go D.

If the whole Ocean indeed were raifed up in Vapour, and that Vapour condensed into Rain, and poured forth upon the dry Land, and there suspended and miraculously stopped from going off by the Almighty Power of God, then might it, together with an equal Quantity of Water raised up from the great Deep, have a considerable Interest in the Deluge. But of this there cannot be any Proof gathered from the Scriptures.

I RETURN now to the first Cause or Means of the Deluge assigned by the Scripture, and that is, the Breaking up of all the Fountains of the great Deep. By the great Deep, in this Place, I suppose, is to be understood the subterraneous Waters, which do and must necessarily communicate with the Sea. For we

fee, that the Caspian, and some other Seas, receive into themselves many great Rivers, and yet have no visible Outlets; and therefore, by subterraneous Passages, must need discharge their Waters into the Abyss of Waters under the Earth, and by its Intervention

into the Ocean again.

THAT the Mediterranean Sea doth not (as I fometimes thought) communicate with the Ocean by any subterraneous Passages, nor thereby impart any Water to it, or receive any from it, may be demonstrated, from that the Superficies of it is lower than the Superficies of the Ocean, as appears from the Waters running in at the Streights of Gibraltar; for if there were any fuch Communications, the Water keeping its Level, the Mediterranean, being the lowest, must by those Passages receive Waters from the Ocean; and not the Ocean, which is (as we have proved) the highest from the Mediterranean. But that it doth not receive any by fubterraneous Passages, is most likely, because it receives so much above Ground. Hence it necessarily follows, that the Mediterranean spends more in Vapour than it receives from the Rivers, which is Mr. Halley's Conclusion; though in some of his Premises, or Hypotheses, he is, I think, mistaken: As, I. In that he numbers the Tiber amongst his nine great Rivers, each of which may yield ten times as much Water as the Thames, whereas

whereas I question whether that yields once fo much: And whereas he passes by all the rest of the Rivers as smaller than it, there are two that I have seen in Italy itself, whereof the one, viz. the Arnus, on which Florence and Pisa stand, seemed to me not inferior in Bigness to the Tiber; and the other, viz. the Athesis, on which Verona stands, I could not guess to be less than twice as big. 2. In that he thinks himself too liberal in allowing these nine Rivers to carry down each of them ten times fo much Water as the Thames doth. Whereas one of those nine, and that none of the biggest neither, viz. the River Po, if Ricciolus his Hypotheses and Calculations be good, affords more Water in an Hour, than Mr. Halley supposes the Thames to do in a Day; the hourly Effusions of the Po being rated at eighteen Millions of Cubical Paces, by Ricciolus; whereas the daily ones of the Thames are computed to be no more than twenty five Millions, three hundred forty four thousand Cubical Yards of Water, by Mr. Halley; but a Geometrical Pace contains five Feet, i.e. 13 of a Yard. Now if the Po pours so much Water hourly into the Sea, what then must the Danow and the Nile do? each of which cannot (I guess) be less than treble of the Po. Tanais, Borvsthenes, and Rhodanus, may equal, if not exceed it. Howbeit, I cannot approve Ricciolus his Hypotheses, judging them

them to be too excessive, but do believe that as to the whole, Mr. Halley comes nearer the Truth. Sure enough it is, that in the Mediterranean, the Receipts from the Rivers fall short of the Expence in Vapour; though in Part of it, that is, the Euxine, the Receipts exceed, as appears from that there is a constant Current sets outward from thence through the Thracian Bosphorus, and Hellespont.

Bur though the Mediterranean doth indeed evaporate more than it receives from the Rivers, yet, I believe, the Case is not the same with the Caspian Sea; the Superficies whereof seems to me not to bear any greater Proportion to the Waters of the Rivers that run into it, than that of the Euxine doth to its; which we have observed not to

fpend the whole Receipt in Vapour.

You will say, Why then do not great Floods raise the Seas? I answer, as to the Caspian, if it communicates with the Ocean, whether the Rivers bring down more or less, it's all one; if more, then the Water keeping its Level, the Caspian raiseth the Ocean; if less, then the Ocean communicates to the Caspian, and raises that. But as to the Mediterranean, we may say, that when it receives more on the one Side, it receives less on the other, the Floods and Ebbs of the Nilus, and the other Rivers, counterbalancing one another: Besides, by reason of the Snows lying upon

upon the Mountains all Winter, the greatest Floods of those great Rivers in Europe do not happen when the Mediterranean evaporates least in the Winter-time, but in the

Spring.

You will demand farther, if the Mediterranean evaporates so much, what becomes of all this Vapour? I answer, It is cast off upon the Mountains, and on their Sides and Tops is condensed into Water, and so returned a-

gain by the Rivers unto the Sea.

IF you proceed to ask what becomes of the Surplufage of the Water, which the Mediterranean receives from the Ocean, and spends in Vapour; I answer, It seems to me that it must be cast farther off over the Tops of the Mountains, and supply in part Rain to these Northern Countries; for we know that the South Wind brings Rain with us, and all Europe over.

Madidis Notus evolat alis. Ovid. Metam.

As to the great Ocean, I do not believe that it evaporates so much as the Mediterranean: Both, 1. Because the whole Mediterranean, excepting the Euxine, lies in a hot Climate, and a great Part of it as it were in a Valley, Ridges of high Mountains, Atlas on one Side, and the Alps and Appennine, &c. on the other running along it. And, 2. Because the Sunface of the whole Ocean bears a greater Proportion to the Waters it receives from

from the Rivers of at least this Continent, than that of the Mediterranean doth to its. And therefore I think also that Mr. Halley exceeds in his Estimate of the Heat of the Supersivies of the Sea Water. I cannot persuade myself, that were it all commixt, I mean the hotter Part with the cooler, all the Surface over to such a Thickness, it would equal the Heat of our Air in the hottest time of Summer. But I leave that to farther Tryal and

Enquiry.

HERE give me leave to suggest, that we are not to think, that all the Vapours that fupply our Rains and Dews proceed from the Sea; no, a great Part of them, viz. all that, when condensed, waters the Earth, and serves for the Nutrition of Plants and Animals, (if not the same individual Water, at least so much) was exhaled out of the Earth before, and returned again in Showers and Dews upon it: So that we receive no more from the Sea, than what the Rivers carry back, and pour into it again. But supposing Mr. Halley's Hypotheses to be good, and that the Ocean doth evaporate, and cast off to the dry Land 21/2 of an Inch Thickness daily, and this fusfices for the Supply of all the Rivers; how intolerably extravagant must their Hypotheses be, who suppose the Rivers of all the World together to yield half an Ocean of Water daily? Though I must confess myself to be at a Loss, as to those vast Rivers of America

and

of ninety Miles broad; for if they should run with any thing a fwift Current, it is indeed inestimable what a Quantity of Water they may pour forth. All, therefore, that I have to say to them, is, That we want a true History and Account of their Phanomena, from their Fountains to their Outlets.

But in contradiction to what I have faid, concerning the Water keeping its Level, and flowing in only at the Straits-Mouth, I understand, that it is the concurrent and unanimous Vote and Suffrage of Mariners, Voyagers, and Philosophers, that there is an Under-Current at the Straits of Gibraltar, the Thracian Bosphorus, and the Baltick Sound. Particularly, M. Marfilly affirms, That the lower Water in the Channel of the Thracian Bosphorus is driven Northward into the Euxine Sea, whilst the upper slows constantly from the Euxine Southward: And, That that which flows from the South is falter and heavier; which he found by letting down a Vessel close shut up, sitted with a Valve to open at pleasure, and let in the lowest Water, which being brought up and weighed, was observed to be ten Grains heavier than the upper. That the upper and lower flows contrary ways, he found by the Fishermens Nets, which being let down deep from Vessels that were fixed, were always, by the Observation of the Fishermen, by the Force of the Current driven towards the Black Sea, G

and by the letting down of a Plummet; for if it were stopp'd and detain'd at about five or six Foot depth, it did always decline towards the Marmora or Propontis; but if it descended lower, it was driven to the contrary part, that is, the Euxine. But, I think, these Experiments are not sufficient to establish and demonstrate such an Under-Current, because, possibly there might be some Mistake in them: And Mr. Smith mentions no fuch thing as any Under-Current there. But yet the same Mr. Smith endeavours to prove an Under-Current, by two Experiments: The first is, the Running-Tide and Half-Tide in the Offing, between the North-Foreland and South-Foreland. Now where it flows Tide and Half-Tide, though the Tide of Flood runs aloft, yet the Tide of Ebb runs underfoot, that is, close by the Ground. See Philosophical Transactions, Numb. 158. p. 564.

The second is, an Experiment made in the Baltick Sound: In one of the King's Fregats they went with their Pinnace into the middle Stream, and were carried violently by the Current: Soon after, they sunk a Bucket with a large Cannon Bullet, to a certain Depth of Water, which gave check to the Boat's Motion; and sinking it still lower and lower, the Boat was driven ahead to Windward against the Upper-Current, the Current alost being not above four

or five Fathom deep; and the lower the Bucket was let fall, they found the Under-Cur-

rent the stronger.

To all this I reply; That I do not underftand how Waters can run backward and forward in the fame Channel, at the fame time.
For there being but one Declivity; this is as
much to affirm, as that a heavy Body should
ascend. It is a Crossing of Proverbs, "Ανω
ποταμῶν, making Rivers ascend to their
Fountains, affirming that to be done, which
all the World hitherto hath look'd upon as
absurd and impossible. And, therefore, the
Matter of Fact had need be well attested:
Which, when to me it shall be, I must then,
manus dare, yield up the Bucklers, and study some Means to solve the Phanomena.

Suppose we, that the Mediterranean empties itself into the Ocean by an Under-Current; there must be a Declivity to carry it down, and, consequently, the upper Superficies of this Under-Current must have its Declivity too, and likewise the contiguous Superficies of the Upper-Current; and so, the Upper-Current must needs ascend in its Course inwards. If you say, it's forc'd in by the Motion of the Ocean, that seems unlikely, because it runs in constantly, as well Ebb as Flood. And, therefore, there seems to be no better Account of it than the Superficies of the Ocean being higher than that of the

Mediterranean.

But to put this Matter out of all doubt, that learned and curious Observer of all Natural and Artificial Rarities that came in his way, Mr. John Greaves, in whose time there was no talk of an Under-Current at the Straits-Mouth, but of contrary-side ones, affirms of his own Knowledge and Observation, That it was a great Mistake, and that there was no such thing as a contrary Current, but that the Water slowed equally inward, as well on the one side of the Channel as on the other. Pyramidograph. p. 101, 102.

By the Breaking up of the Fountains of the Great Deep, is, I conceive, meant, the making great Islues and Apertures for these subterraneous Waters to rush out. You will say, how could that be, sith the Water keeps its Level, and cannot ascend to a greater Height above the common Center, than the Superficies of the Sea is, much less force its Way, remove Obstacles, and break open Pas-

fages?

I ANSWER, According to them that hold that all Rivers come from the Sea by subterraneous Passages, it is no more than daily happens. For they must needs grant, that the Water in subterraneous Channels, is raised as far above the Level of the Ocean, as are the Heads and Fountains of great Rivers. Which, considering the Height of their first Springs up the Mountains, the Length of their Courses, and the Swiftness of their Streams

Streams for a great part of the Way, is very confiderable, a constant Declivity being necessary to their Descent. And, therefore, I can by no means assent to the Learned Doctor Plot, (if I understand him aright) \* That \* Hist. the Valleys are as much below the Surface of Nat. Stafthe Sea, as Mountains are above it. For, p. 79: how then could Rivers descend down to the Sea through those Valleys? The Sea would rather run into them, and make Sinus's; or else, if they were enclosed, the Water would

stagnate there, and make Pools.

IF this be done by way of Filtration (which feems to be the most likely Means of raising the Water) I do not see, but these Filters may fuck up the whole Ocean; and if Apertures and Outlets large enough were made, pour it out upon the Earth in no long time. I cannot be fully reconciled to this Opinion, though it hath great Advocates, especially the fore-mentioned very learned and ingenious Person, Dr. Robert Plot. I acknowledge fubterraneous Waters: I grant a Confluence and Communication of Seas by Under-ground Channels and Passages: I believe, that wherever one shall dig as deep as the Level of the Sea, he shall seldom fail of Water; the Water making its way through Sand, and Gravel, and Stones. In like manner, as it is observed of the River Seine, that in Floodtimes all the neighbouring Wells and Cellars are filled with Water, and when the River decreases

## Consequences of

decreases and sinks again, those Waters also of the Wells and Cellars diminish, and by degrees fall back into the River, so that there are scarce any Wells or Fountains in the Plains near the River, but their Waters keep the Level of the Rivers, rising and falling with it.

But this inferior constant Circulation and perpetual Motion of Water, seems to me not yet sufficiently proved and made out. I think that the Patrons and Abettors of this Opinion; have not satisfactorily demonstrated, how it is, or can be performed. To what is offered concerning the Center of Gravity being nearer to our Continent, by reason of the Preponderancy of the Earth, and the Waters lying, as it were, on an Heap in the other Hemisphere, I answer, 1. That in the present terraqueous Globe, the New World, which lies between the two great Seas, and almost opposite to our Continent, doth in some measure counterpoise the Old, and take off a great part of the Advantage, which, by reason of its Preponderancy, it might otherwise have. Moreover, I am of Mr. Brierwood's Opinion, that there may be, and is a vast Continent toward the Southern Pole, opposite to Europe and Asia, to counterpoise them on that side; nay, I do verily believe, that the Continents and Islands are so proportionably scattered and disposed all the World over, as if not perfectly and exactly,

yet

yet very nearly to counter-balance one another; so that the Globe cannot walter or reel towards any Side: And that the Center of the Convex Superficies of the Sea, is the true Center of the whole Terrestrial Sphere, both of Motion, and of Gravity. I add also of Magnitude, which is exceedingly convenient, as well for the Facility as the Equability of the Earth's Diurnal Motion. This Hypothesis of the Continent's being dispers'd equally on all Sides of the Globe, makes these Centers concurr in one Point, whatever Caufe we assign of the raising up the dry Land at first. Whereas if we should suppose the dry Land to have been raised up by Earthquakes only on one Side of the Globe, and to have cast off the Water to the other, and also that the Waters could find no Way into the Caverns that were left within; then the watery Side must needs preponderate the Land Side, and bring the Center of Gravity nearer to its own Superficies, and so raise the Land still a great deal higher, and make a considerable Distance between the Centers of Magnitude, and of Gravity. In our Hypothesis of the equal Dispersion of the Continents and Islands, no such thing would happen, but each Continent, taking it with all its internal Caverns, whether lighter or heavier than its Bulk in Water, that is, whether the Water did make its way into the Caverns thereof, or did not, (for in the first Case it would be heavier,

heavier, in the fecond lighter) would have its Counterpoise on the opposite Side, so that the Centers would still concurr. The Case would be the same, if the dry Land were discovered, and the Mountains raised by the immediate Application of the Divine Power. 2. The Sea being no where above a German Mile deep, (for which we have good Authority) in most Places not half so much, taking then, as a Middle Term, half a Mile. Suppose it every where half a Mile deep, (the Earth below the Sea, we have no reafon to suppose of different Gravity) what Proportion hath this half Mile's Thickness of Water to the whole Terraqueous Globe, whose Semidiameter is, by the Account of Mathematicians, Three thousand four hundred and forty Italian Miles? What little Advantage then can it have of the Earth opposite to it, in Point of Preponderancy? 3. Granting the Center of Gravity should be nearer our Continent: The Center being the lowest Place, and the Water a fluid Body, unless stopped, (which it might indeed be, if it were encompassed round with high Shores, as high as the Mountains, without any Breaks or Outlets in them) where it found Declivity, it would descend as near as it could to it, without any Regard of the Earth's Preponderancy. And though we should grant, that the Dryness of the Shores might stop it, and cause it to lie on a Heap, yet would it run up the Channels of Rivers, till it come as near as possible to the Center of Gravity. Indeed the Rivers themselves could not descend, but must run towards the Middle of the Continent. All this, I think, will follow from this Hypothesis by as good Consequence, as the Waters being forced through the subterraneous Channels out at the Springs. Dr. Hook's Opinion, That the Preponderancy of the falt Water above the fresh, raises up the fresh Water above the Level of the falt, as high as the Springs and Fountain-Heads, and forces it out there, would have a great Probability in it, were there continued strait Channels or Conduits from the Bottom of the Sea to the Eruption of Springs, which I believe there are not. I do not peremptorily affirm, that all Fountains do proceed from Rain; only I contend, that Rain may suffice to feed them, and that probably it doth feed ordinary Springs. This the ingenious French Author doth well demonstrate in the River Seine, and I believe it is demonstrable in most other Rivers.

The little Brook that runs near my Dwelling, and hath its Head or Source not above four or five Miles off, where there is no extraordinary Eruption of Water, all along its Course receives small Rivulets on both Sides; which though they make a considerable Stream at five Miles Distance from the Fountain-Head, yet singly are so small, that they

may very well be conceived to drain down from the higher Grounds that lie about them. And taking the whole together, it is a very considerable Length and Breadth of Land, that contributes to the Maintenance of this little River: So that it may eafily be believed, that all its Water owes its Original to Rain: Especially, if it be considered farther, that in Winter-time, after the Rains are fallen, the Ground sated, and the Ditches full, the Stream of this River, during the whole Winter following, is for the most part, unless in Frosts, double of what it was in Summer. Which Excess can proceed from nothing but Rain and Mists, at least it would be Rashness to assign any other Cause, when there is so obvious and manifest an one. Moreover, that Rain affords no small Quantity of Water, is clear also from great Floods, wherein it might be proved, that in few Days there descends more Water than would supply the ordinary Stream for a good part of Summer. Now, to compare great Things with small; I have seen many of the biggest Rivers in Europe, the Danow, Rhine, Rhosne, and Po; and when I consider the Length of their Courses, the Multitude of confiderable Rivers and Brooks they receive; and all these from their first Rise, made up by Degrees of little Rivulets and Gills, like my neighbouring Brook; the huge Mountains and vast Extent of higher Grounds

Grounds they drain: To me it feems (and I have feen all their Streams near their Outlets, except the Danow's, and its after four hundred Miles Descent) that they do not bear any greater Proportion to the Rivers and Rivulets they receive, and the immense Tracts of Land that feed them, than my Brook doth to its small Rills and Compass of Ground.

But in this, I confess, I do not descend to the Niceness of Measuring and Calculation, but satisfy myself with rude Conjectures, taking my Measures, as the Cestrians say, by the Scale of the Eye.

It will here be objected, That the Rain never finks above ten Foot deep at most into the Earth, and therefore cannot supply the

Springs.

Answ. This indeed, if it were true, would much enervate, nay, quite overthrow our Opinion: And therefore we must fortify this Point, and effectually demonstrate, beyond all Possibility of Denial or Contradiction, That Rain-water doth sink down, and make its Way into the Earth; I do not say, ten, or twenty, nor forty, but an hundred, nay, two or three hundred Foot, or more.

FIRST then, in Pool-Hole, in the Peak of Derbyshire, there are in some Places constant Droppings and Destillations of Water from the Roof: Under each of which (to note that

by the by) rifes up a Stone Pillar, the Water precipitating some of those stony Particles, which it had washed off the Rocks in passing through their Chinks. These Droppings continue all the Summer long. Now it feems clear to me, that the Rain-water making its Way through the Veins and Chinks of the Rocks above it, and yet but flowly, by reason of the Thickness of the Mountain, and Straitness of the Passages, supplies that Dropping all the Year round; at least, this is much more rational than any different Hypothesis. If the Water distills down faster in Winter-time and wet Weather, than it doth in Summer (which I forgot to ask) the Experiment would infallibly prove our Assertion. In Confirmation of this Argument, Albertus Magnus (as I find him quoted in Dr. Wittie's Scarborough Spaw) tells us, That at the Bottom of a solid Rock one hundred and thirty Fathoms deep, he saw Drops of Water distilling from it in a rainy Season.

SECONDLY, It is well known, and attested to me by the People at Buxton when I was there, That out of the Mouth of the same Pool-Hole, after great and long continuing Rains, a great Stream of Water did usually iffue forth: And I am sure it must make its Way through a good Thickness of Earth, or

Rocks, before it could come in there.

THIRDLY, What becomes of all the Water that falls on Newmarket-Heath, and Gogmagog

Hills,

Hills, I prefume also Salisbury-Plain, and the like spungy Grounds all Winter long, where we see very little run off any way? It must needs sink into the Ground more than ten Foot deep.

FOURTHLY, Many Wells, whose Springs lie at least twenty Foot deep, we find by Experience, do often fail in great Droughts

in Summer-time.

FIFTHLY, In Coal Delfs, and other Mines, in wet Weather the Miners are many times drown'd out, (as they phrase it) though no Water runs down into the Mouths of their Pits or Shafts. Nay, Dr. Wittie tells us, in his Description of the Vertues of the Scarborow Spaw, pag. 105. That after great Inundations of Rain, the Miners find the Water frequently distilling through the solid Earth upon their Heads; whereas in Summer, or dry Seasons, they find no Interruption from thence at all.

FARTHER, to confirm this Particular, I wrote to my Honoured Friend Sir Thomas Willughby, Bar. desiring him to examine his Colliers concerning it, and send me Word what Report they make; and from him received this Account: If there be Springs lie before you come at the Coal, they carry the Water away; but if there be none, it falls into the Works in greater or less Quantity, according as the Rains fall. Which Answer is so much the more considerable, in that it gives

gives me a farther clear Proof, that Springs are fed by Rain-water, and not by any Communications from the Sea; their Original being above the Beds of Coal, they receiving the Rain-water into their Veins, and deriving it all along to their Fountains or Eruptions, above the Coals.

I MIGHT add out of him, [Dr. Wittie] Fifthly, p. 85. That the Scarborough Spaw, notwithstanding it breaks out of Ground within three or four Yards off the Foot of the Cliff, which is near forty Yards high, and within a Quarter of a Mile there is another Hill, that is more than as high again as the Cliff, and a Descent all the way to the Cliff, so as the Rainwater cannot lie long upon the Ground; yet it is observable, that after a long Rain, the Water of the Spaw is altered in its Taste, and lessened in its Operation; whereas a rainy Day or two will not sensibly burt it. And now I am transcribing out of this Author, give me Leave to add an Observation or two in Confirmation of Rains being the Original of

Springs. The first is (pag. 97.) this:

IN England, in the Years 1654, 55, and 56.

when our Climate was drier than ever it had been mentioned to be in any Stories, so as we had very little Rain in Summer, or Snow in Winter, most of our Springs were dried up, such as in the Memory of the eldest Men living had never wanted Water, but were of those Springs we call Fontes Perennes, or at

least

least were esteemed so. He instances also a parallel Story out of Heylin's Geography, in the Description of Cyprus, where the Author relates; That in the Days of Constantine the Great, there was an exceeding long Drought there, so as in thirty six Years they had no Rain, insomuch as all the Springs and Torrents, or Rivers, were dried up; so that the Inhabitants were forced to forsake the Island, and to seek for new Habitations for want of fresh Water.

THE second is, p. 84. That in the Wolds or Downs of Yorkshire they have many Springs break out after great Rains, which they call Gypsies, which jet and spout up a great

Height.

NEITHER is this Eruption of Springs after long Rains, proper and peculiar only to the Wolds of Yorksbire, but common to other Countries also, as Dr. \* Childrey witnesseth, in \*Britanthese Words: Sometimes there breaks out nia Ba-Water in the manner of a sudden Land Flood, conicaout of certain Stones, that are like Rocks standing aloft in open Fields, near the Rising of the River Kynet [in Kent] which is reputed by the common People a Fore-runner of Dearth. That the sudden Eruption of Springs in Places where they use not always to run. should be a Sign of Dearth, is no Wonder. For these unusual Eruptions, (which in Kent we call Nailbourns) are caused by extreme Gluts of Rain, or lasting wet Weather, and never hap-

pen but in wet Years; witness the Year 1648. when there were many of them; --- and to our Purpose very remarkable it was, that in the Year 1654. Several Springs and Rivulets were quite dried up, by reason of the precedent Drought, which raged most in 1651, 1652, and 1653. As the Head of the Stour, that rises near Eltham in Kent, and runs through Canterbury, was dry for some Miles Space: And the like happened to the Stream that crosseth the Road-way between Sittingburn and Canterbury, at Ospring near Feversham, which at other times ran with a plentiful Current, but then wholly failed. So we see that it is not infrequent for new Springs to break out in wet Years; and for old ones to fail in great Droughts. And Strabo, in his first Book out of Xanthus the Lydian, tells us, That in the Time of Artaxerxcs, there was so great a Drought, that Rivers, and Lakes, and Wells of Water failed, and were dried up.

I CANNOT here also forbear to add, the probable Account he [Dr. Wittie] gives of the Supply of the Spring-Well on the Castle-Hill at Scarborough; at which, I confess, I was somewhat puzzled. This Well, saith he, though it be upon the Top of the Rock, not many Yards deep, and also upon the Edge of the Cliff, is, doubtless, supplied by secret Channels within the Ground, that convey the Rain and Showers into it, being placed on a dependent Part of the Rock; near unto which, there are also Cel-

lars

lars under an old ruinated Chappel, which, after a great Rain, are full of Water, but are dried

up in a long Drought.

As for what is said concerning the River Wogla's pouring out so much Water into the Caspian Sea, as in a Year's time would make up a Mass of Water equal to the Globe of the Earth; and of the hourly Effusions of the River Po in Italy, which Ricciolus hath computed to amount to 18000000 cubical Paces of Water; whence a late learned Writer hath probably inferred, that all the Rivers in the World together, do daily discharge half an Ocean of Waters into the Sea; I must confess myself to be unsatisfied therewith. I will not question their Calculations, but I suspect they are out in their Hypotheles.

The Opinion of Mr. Edmund Halley, that Springs and Rivers owe their Original to Vapours condensed on the Sides of Mountains, rather than unto Rains, I acknowledge to be very ingenious, grounded upon good Observations, and worthy of its Author; and I will not deny it to be in part true, in those hot Countreys in the Torrid Zone, and near it; where, by reason of the great Heats, the Vapours are more copiously exhaled out of the Earth, and, it's likely, carried up high in the Form of Vapours. The inferiour Air, at least, is so charged with them, and by that means so very moist, that, in some Places,

H their

their Knives rust even in their Pockets; and in the Night, so very fresh and cold, partly also by reason of the Length of the Nights; that exposing the Body to it, causes Colds and Catarrhs, and is very dangerous: Whence also their Dews are so great, as in good measure to recompense the Want of Rain, and serve for the Nourishment of Plants; as they

do even in Spain itself.

I shall first of all propose this Opinion in the Words of the Author, and then discourse a little upon it. After he had enumerated many of the high Ridges and Tracts of Mountains in the four Quarters of the World, he thus proceeds: Each of which far surpass the usual Height to which the aqueous Vapours of themselves ascend, and on the Tops of which the Air is so cold and rarified, as to retain but a small Part of those Vapours that shall be brought thither by the Winds. Those Vapours, therefore, that are raised copiously in the Sea, and by the Winds, are carried over the low Lands to those Ridges of Mountains, and are there compelled by the Stream of the Air to mount up with it to the Tops of the Mountains, where the Water presently precipitates gleeting down by the Crannies of the Stone; and part of the Vapour entring into the Cavities of the Hills, the Water thereof gathers, as in an Alembick, into the Basons of Stone it finds; which being once filled, all the Overplus of Water that comes thither, runs over by the lowest Place,

and

and breaking out by the Sides of the Hills, forms single Springs. Many of these running down by the Valleys, or Guts, between the Ridges of the Hills, and coming to unite, form little Rivulets or Brooks. Many of these, again, meeting in one common Valley, and gaining the plain Ground, being grown less rapid, become a River: And many of these being united in one common Channel, make such Streams, as the Rhine, and Rhosne, and the Danube; which latter one would hardly think the Collection of Water condensed out of Vapour, unless we consider how vast a Tract of Ground that River drains, and that it is the Sum of all those Springs, which break out on the Southside of the Carpathian Mountains, and on the North-side of the immense Ridge of the Alps, which is one contained Chain of Mountains from Switzerland to the Black Sea. And it may almost pass for a Rule, that the Magnitude of a River, or the Quantity of Water it evacuates, is proportionable to the Length and Height of the Ridges, from whence its Fountains arise. Now this Theory of Springs is not a bare Hypothesis, but founded on Experience, which it was my Luck to gain in my Abode at S. Helena; where, in the Night-time, on the Tops of the Hills, about Eight hundred Yards above the Sea, there was so strange a Condensation, or rather Precipitation of the Vapours, that it was a great Impediment to my Celestial Observations; for, in the clear H 2 Sky.

Sky, the Dew would fall so fast, as to cover each half-quarter of an Hour my Glasses with little Drops, so that I was necessitated to wipe them off so often; and my Paper, on which I wrote my Observations, would immediately be so wet with the Dew, that it would not bear Ink: By which it may be supposed, how fast the Water gathers in those mighty high Ridges I but now named. ——— At last he concludes: And I doubt not but this Hypothesis is more reasonable, than that of those who derive all Springs from the Rain-waters, which yet are perpetual, and without Diminution, even when no Rain falls for a long space of Time.

This may, for ought I as yet see or know, be a good Account of the Original of Springs in those fervid Regions, though even there, I doubt, but partial; but in Europe, and the more temperate Countries, I believe the Vapours in this manner condensed, have but little Interest in the Production of them, though I will not wholly exclude them.

For,

First, The Tops of the Alps above the Fountains of four of the greatest Rivers in Europe, the Rhine, the Rhosne, the Danow, and the Po, are, for about six Months in the Year, constantly covered with Snow, to a great thickness; so that there are no Vapours all that while that can touch those Mountains, and be by them condensed into Water; there falls nothing there but Snow,

and

and that continuing all that while on the Ground without Diffolution, hinders all Access of Vapours to the Earth; if any rose, or were by Winds carried so high in that Form, as I am confident there are not. And yet, for all that, do not those Springs fail, but continue to run all Winter; and it is likely too, without Diminution; which is a longer time than Droughts usually last; especially, if we consider that this Want of Supply is constant and annual; whereas, Droughts are but rare and accidental. So that we need not wonder any more, that Springs should continue to run, and without Diminution too, in times of Drought. True it is, that those Rivers run low all Winter, so far as the Snow extends, and to a good distance from their Heads; but that is for want of their accidental Supplies from Showers. Nay, I believe, that even in Summer, the Vapours are but rarely raifed fo high in a liquid Form in the free Air, remote from the Mountains, but are frozen into Snow, before they arrive at the Height. For the Middle Region of the Air, where the Walk of the Clouds is, at least the superiour part of it, is so cold, as to freeze the Vapours that ascend so high, even in Summer-time. For we see, that in the Height and Heat of Summer, in great Thunder-storms, for the most part it hails: Nay, in fuch Tempests I have seen mighty Showers of great Hail-stones fall, some as big as H 3

Nutmegs or Pigeons Eggs; and in some places, such Heaps of them, as would load Dung-Carts, and have not been dissolved in a day or two. At the same Seasons, I have observed, in some Showers, Hail-stones fall of irregular Figures, and throughout pellucid, like great Pieces of Ice, with feveral Snags or Fangs issued out of them: Which, how they could be supported in the Air till they amounted to that Bulk and Weight, is a thing worthy to be more curiously considered. For either they must fall from an incredible Height, the Vapours they encountred by the Way, condensing, and, as it were, crystallizing upon them into Ice, and in time augmenting them to that Bulk; or else, there must be fome strange and unknown Faculty in the Air to sustain them. That the superiour Air doth support heavy Bodies better than the inferiour, the Flight of Birds seems to be a clear Demonstration. For, when they are mounted up on High, they fly with less Fatigue, and move forward with greater Facility, and are able to continue longer upon the Wing without Delassation, than in the lower Air they could possibly do. And, therefore, when they are to make great Flights, they foar aloft in the Air, at a great Height above the Earth. So have I often feen a a Flock of Wild-geese mounted so high, that though their Flight be swift, they seemed to make but little Way in a long time, and to

proceed on their Journey with ease, and very leisurely, by reason of their Distance. And yet one would think, this were contrary to Reason, that the lighter Air, such as is the fuperiour, should better support a weighty Body than the heavier, that is, the inferiour. Some imagine, that this comes to pass by reason of the Wind, which is constantly moving in the upper Air, which supports any Body that moves contrary to it. So we see that those Paper-kites which Boys make, are raised in the Air, by running with them contrary to the Wind: And when they are advanced to a great Height, do but stick down the nether End of the Line, to which they are fastned, into the Ground, they will be continued by the Wind at the same Height they were, fo long as it lasts and abides in the fame Quarter. In like manner, the Birds flying contrary to the Wind, it supports and keeps them up. But if this were the only Reason, methinks it should not be so easie, but rather very laborious for Birds to fly against the Wind, so as to make any considerable Progress in the superiour Air, as we fee they do. And, therefore, possibly they may be nearer the Right, who suppose, that the Gravity of Bodies decreases proportionably to their Distance from the Earth; and that a Body may be advanced fo high, as quite to lofe its Gravity and Inclination, or Tendency to the Center: Of which I do not H 4 see

fee how it is possible to make Experiment. For, to what is said by some, to have been tried, that a Bullet shot perpendicularly upward out of a great Gun, never descended

again, I give no credit at all.

Bur to leave that, it is certain, that the Vapours, after they are mounted up to a considerable Height in the Air, are congealed and turned into the immediate component Principles of Snow, in which Form I conceive they acquire a Lightness, and are apt to ascend higher than they could do, should they retain the Form of a humid Vapour; as, we see, Ice is lighter than Water, out of which it is frozen. But whether this be the reason of their Ascent, or not, I am sure of the Matter of Fact, that these Snow-Clouds do ascend far above the highest Tops of the Alps; For, passing over a Mountain in the Grisons Country, on the very Ridge of them, in the beginning of the Spring, it snowed very fast during my whole Passage for six hours; and yet the Clouds seemed to be as far above my Head, as they do here in England; and a great Height they must be, for the Snow to gather into so great Flakes, and to continue so long falling; nay, it may be three times fo long. Moreover, we see, that the highest Piles and Summits of those Mountains are covered with Snow. And I am affured, that all the Winter long, at intervals, it snows upon the Tops of the Alps. 2. IN

2. In the Spring-time, when the Snow difsolves, some of these Rivers that slow down from the Alpine Mountains, run with a full Stream, and overflow their Banks, in clear Sun-shine Weather, though no Rain falls, as I myself can witness; and, therefore, I prefume, that all the rest do so too, as the Inhabitants affirmed. But, in the Summer-time, after the Snow hath been some time melted, their Streams decay again, notwithstanding any Vapours condensed upon them, proportionable to the Droughts; neither are there

any Floods, but upon Falls of Rain.

3. THAT the Snow dissolved, and soaking into the Earth, is the Original of the Alpine Springs; a probable Argument may be taken from the Colour of the Water of those Rivers which descend from the Alps, at least on this Northern-side, which I observed to be of of a Sea-green, even to a great distance from their Heads; which, whence can it proceed, unless from the nitrous Particles of the Snowwater, of which they confift? Another also from the Bronchocele, or \* gutturine Tumour, \* Swoln an Endemial Difease of the Natives of those Throats. Parts, which Physicians and Naturalists attribute to the Water they drink, not without good Reason; because, say they, it consists of melted Snow, which gives it that malignant Quality. + Scaliger speaking of this + De Sub-Disease, saith, Id ab aqua fit è nivibus lique- illit. Ex-fastis, que multum terrestris & crudi continent. sett. 2.

But because Julius Palmarius may possibly be in the right, who imputes this Disease to the Steams of the Minerals, especially Mercurial, wherewith these Mountains abound, which infect the Waters, and render them noxious to the nervous Parts; I shall not in-

fist upon this Particular.

In confirmation of what I have said concerning the Original of the Alpine Springs, I shall add the Opinion of the Learned Alphonsus Borellus, concerning the Fountains springing up, or issuing out of the Sides of Mount Ætna in Sicily. They are probably (saith he) either generated, or at least encreased, from the melting of the Snow, which doth perpetually occupy the Top of the Mountain. And this is manifest, in that they are not diminished, nor decrease in Summer, as elsewhere it happens, but often flow more plentifully. Lib. De incendiis Ætnæ.

WHAT Mr. Halley saith of Springs, That they are perpetual, and without Diminution, even when no Rain salls, for a long Space of Time. If he understands it generally of all Springs, I add, that are accounted quick ones too, I deny his Assertion: That some there may be of that Nature, I grant. A Reason whereof may be given, viz. that the Outlet is too small to empty the Water of all the Veins and Earth that lie above it in a long time. In our Native Country of England, there are living and lasting Springs ri-

fing

fing at the Feet of our fmall Hills and Hillocks, to which, I am fure, the Vapours contribute very little; which is fo obvious to every Man, that, I think, I need not spend

time to prove it.

YET must I not dissemble or deny, that in the Summer-time the Vapours do afcend, or are carried up in that Form, by the Sides of the Mountains to their highest Tops, and above them; for there falls no Snow there, in the Heat of Summer; and that which lies there, is, for the most part, dissolved. But that Rain falls plentifully there, I myself can witness; having been on the two highest Tops of the Mount Jura, (which keeps the Snow all Winter) on the one called Thuiri in a Thunder-shower; and on the other, called la Dolaz, in a smart and continuing Rain: So that I will not deny, but in Summer-time the Vapours may contribute somewhat to the Springs; as I have elsewhere intimated: Clouds almost continually hanging upon the Tops of the Mountains, and the Sun having there but little Power.

AND now that I am discoursing of these things, give me leave to set down an Observation I made in the last great Frost, the sharpest that was ever known in the Memory of Man, which I had before met with in Books, but did not give firm credit to, that is, that notwithstanding the Violence of the Frost, all the Springs about us brake out, and

ran more plentifully than usually they did at any other time: Which I knew not what to impute to, unless perchance the close Stopping the Pores of the Earth, and keeping in that Part, which, at other times, was wont to vapour away; which Account I neither then could, nor can yet fully acquiesce in.

To this I will here add an Abstract of a Letter, written by my honoured Friend Dr. Tancred Robinson.

YOU may, peradventure, meet with some Opposition against your Hypothesis of 'Fountains, though, indeed, I am more and ' more confirm'd in your Opinion of them, and the Use of the Mountains. Father Tachart, ' in his fecond Voyage to Siam, fays, When ' he went up to the Top of the Table Moun-' tain at the Cape of Good Hope, the Rocks and Shrubs were perpetually dropping, and feed-'ing the Springs and Rills below, there being generally Clouds hanging on the Sides, near the Top. This constant Distillation of Vapours from the Ocean, on many high Ridges of that great Promontory, may, per-adventure, be one Cause of the wonderful 'Fertility and Luxury of the Soil, which produces more rare Plants and Animals than any 'known Spot of Ground in the World; the Discovery whereof is owing to the Curiosity 'and Wisdom of the Dutch. The same Obfervation hath been frequently made by our 'English

English Merchants in the Madera and Canary Islands, (the first of which is near in the ' same Latitude on the North of the Aquator, that the aforementioned Cape is in the South) especially, in their Journey's up to the Pike of "Teneriff, in which, at such and such Heights, they were always wet to the Skin, by the Droppings of the great Stones, yet no Rain over-head; the fame I have felt in passing over some of the Alps. The Trees, which in the Islands of Ferro, St. Thomas, and in Guie nea, are said to furnish the Inhabitants with 'most of their Water, stand on the Sides of vast Mountains: Vossius, in his Notes on Pomponius Mela, affirms them to be Arbore-'frent Ferula's; though indeed, according to Paludanus his dry'd Sample fent to the Duke of Wirtenberg, they feem rather to be of the 'Laurel Kind; perhaps there are many different Sorts of them. I believe there is something in the many Relations of Travellers 'and Voyagers concerning these Trees; but 'then I fancy they are all mistaken, when they fay, the Water issues out of the Trees: The Vapours stop'd by the Mountains, condense and distill down by the Boughs. There being no Mountains in Egypt, may be one Rea-' son why there is little or no Rain in that 'Country, and consequently no fresh Springs; therefore in their Caravans they carry all their Water with them in great Borracio's, and they owe the Inundation of their River Nile to the 's stationary 's stationary or periodical Rains on the high Parts of Æthiopia. This may be the Cause that the vast Ridge and Chain of Mountains in Peru are continually water'd, when the great Plains in that Country are all dry'd up and parch'd. This Hypothesis concerning the Original of Springs from Vapours, may hold better in those hot Regions, within and near the Tropicks (where the Exhalations from the 'Sea are most plentiful, most rarify'd, and Rain ' fcarce) than in the temperate and frigid ones (where it rains and snows generally on the Vertices of the Mountains) yet even in our European Climates I have often observ'd the Firs, Pines, and other Vegetables near the Summits of the Alps and Appennines, to drop ' and run with Water, when it did not rain above; some Trees more than others, according to the Density and Smoothness of their Leaves and Superficies, whereby they stop 'and condense Vapours more or less.' The Beams of the Sun having little Force on the 'high Parts of Mountains, the interrupted Vaopours must continually moisten them, and (as 'in the Head of an Alembick) condense and trickle down; fo that we owe part of our 'Rain, Springs, Rivers, and Conveniencies of Life, to the Operation of Distillation and Circulation by the Sun, the Sea, and the Hills, without even the last of which, the Earth would scarce be habitable. This present Year, in Kent, they have had no Rain since March · last,

'last, therefore most of their Springs are dry 'at this very Day, as I am assured from good 'Hands. The high Spouting of Water, even 'to three Fathoms perpendicular out of innumerable Holes, on the Lake Zirknitz in Car-'niola, after Rains on the adjacent Hills, ex-'ceeds the Spirting Gips, or Natural Jet 'd'Eaus we have in England.

Nov. 12. 1691.

Tancred Robinfon:

Since the Receipt of this Letter, an Experiment (give me leave so to call it) occurred to me, which much confirmed me in the Belief and Persuasion of the Truth of those Histories and Relations which Writers and Travellers have delivered to us concerning dropping Trees in Ferro, S. Thome, Guinea, &c. of which before I was somewhat dissident; and likewise in the Approbation of the Hypothesis of my Learned Friend Dr. Tancred Robinson, for the solving of that Phanomenon. The same also induces me to believe, that Vapours may have a greater Interest in the Production of Springs, even in temperate and cold Regions, than I had before thought. The Experiment or Observation is this:

ABOUT the Beginning of December, 1691, there happened to be a Mist, and that no very thick one, which continued all Day; the Vapour whereof, notwithstanding the Trees were wholly devested of Leaves, condensed so fast upon their naked Branches and

Twigs,

Twigs, that they dropped all Day at such a rate, that I believe the Water distilling from a large Tree in twenty four Hours, had it been all received and reserved in a Vessel, might have amounted to a Hogshead. What then may we rationally conjecture, would have dropped from such a Tree; had it been covered with Leaves of a dense Texture, and smooth Superficies, apt to collect the Particles of the Vapour, and unite them into

Drops?

It is clear by this Effect, that Trees do distill Water apace, when Clouds or Mists hang about them; which they are reported by Benzo constantly to do about the Fountain-Tree in Ferro, except when the Sun shines hot upon it. And others tell us, that that Tree grows upon a Mountain too: So that it is no wonder, that it should drop abundance of Water. What do I speak of that Tree? all the Trees of that Kind grow on the Sides of vast Mountains, as Dr. Robinfon hath noted, yet he thinks that now and then many Trees may run and distill in Plains and Valleys, when the Weather has been fair, but then this Phanomenon happens very rarely, whereas in the other 'tis regular and constant. Besides, that in hot Regions Trees may in the Night-time distill Water, though the Air be clear, and there be no Mist about them, seems necessarily to follow, from Mr. Halley's Experiment.

Now,

Now, if there be in Mists thus much Vapour condensed upon Trees, doubtless also there is in Proportion as much upon the Surface of the Earth and the Grass; and consequently, upon the Tops and Ridges of high Mountains, which are frequently covered with Clouds, or Mists, much more; so much as must needs have a great Interest in the Production and Supply of Springs, even in

temperate Countries.

But that invisible Vapours, when the Sky is clear, do at any time condense so fast upon the Trees, as to make them drop, I never observed in England, or elsewhere, no not in the Night Season, though I do not deny, but upon the Appennine and Southern Side of the Alps, and elsewhere in the hotter Parts of Europe, in Summer Nights, they may. However, considering the Penetrancy of such Vapours, that in moist Weather they will infinuate themselves deeply into the Pores of dry Wood, so that Doors will then hardly shut, and Chinks and Crannies in Boards and Floors be closed up, I know not but that they may likewise strike deep into the Ground, and together with Mists contribute to the Feeding and Maintenance of Springs, in Winter-time, when the Sun exhales but little; it being an Observation of the learned \* Fromondus, Quod byeme nec nivali, nec \* Meteor: imbrifera, fontes tamen aquam largius quam lib.5. c.7.

astate (nisi valde pluvia sit) vomant: That

in Winters neither snowy nor rainy, yet Fountains pour forth more Water than in Summer, unless it happen to be a very wet Season. Yet are their Contributions inconsiderable, if compared with the Supplies that are afforded by Rains. And one Reason why in Winter Fountains slow more plentifully, may be, because then the Sun defrauds them not, nor exhales any thing out of the Earth, as in Summer-time he doth.

THEREFORE, whenever in this Work I have affigned Rain to be a fufficient or only Cause of Springs and Rivers, I would not be underflood to exclude, but to comprehend therein Mists and Vapours, which I grant to have some Interest in the Production of them, even in temperate and cold Regions, and a very considerable one in hot. Though I cannot be perfuaded, that even there they are the principal Cause of Springs, for that there fall fuch plentiful and long continuing Rains, both in the East and West-Indies, in the Summer Months: That Rains are the only Cause of the Fertility of the Earth, I am convinced by what was lately suggested to me by my honoured Friend Dr. Tancred Robinson, that all Dearths proceed from Droughts as well in hot Countries as in temperate and cold, be the Vapours what they will. The Scripture confirms this, by joining Rain and fruitful Seasons together.

But

But to return from whence we digressed, that is, to the Consideration of that Hypothe-fis, or Opinion, That all the Rivers of the Earth discharge into the Sea half an Ocean

of Waters daily.

THE Fruitfulness of the Earth is also in a great Measure owing to Floods, which proceed from Rain falling upon the Mountains, and washing down thence a great deal of Earth, and spreading it upon the lower Grounds and Meadows, which renders these fo fruitful, that they bear plentiful Crops of Grass yearly, without any Culture or Manuring. An eminent Instance of this is the Land of Egypt, which owes its great Luxuriancy to the annual Overflowings of the River of Nile.

I HAVE read of some Philosophers, who imagined the Earth to be a great Animal, and that the Ebbing and Flowing of the Sea was the Respiration of it. And now, methinks, if this Doctrine be true, we have a farther Argument to confirm their Opinion: For this perpetual Motion of the Water answers very well to the Circulation of the Blood, the Water moving faster, in Proportion to its Bulk, through the Veins of this round Animal, than the Blood doth through those of other living Creatures. To which we may add farther, that to maintain this constant Circulation, there is also, probably, about the Center of the Earth a perpetual Fire, an-1 2

fwering to the Biolychnium in the Heart; but if not about the Center, yet certainly in profound Caverns, and even under the very Bottoms of the Seas; to which fome, and no mean Philosophers, have attributed the Ebbing and Flowing of its Waters.

But because (as I said before) this Opinion seems to me intolerably extravagant, I shall let it pass without any serious Consideration; and also omit the Inferences I made from it in the former Edition of this Work.

For (as I have noted before) this forty Days Rain, at the Time of the Deluge, was no ordinary one, fuch as those that usually distill down leisurely and gently in Wintertime, but like our Thunder-Storms and violent Showers, Catarracts, and Spouts, which pour forth more Water in an Hour than they do in four and twenty: So that in forty Natural Days the Clouds might well empty out more than eight Oceans of Water upon the Earth. And so we need not be to seek for Water for a Flood; for the Rain falling at that rate we have mentioned, would, with the Addition of as much Water from the fubterraneous Abyss, or great Deep, in the Space of forty natural Days, afford Water enough to cover the Earth, so far as to set the Ark afloat, or raise it up so high, as that its Bottom should not touch the Ground.

I HAVE but one thing more to add upon this Subject; that is, that I do not fee how

their

their Opinion can be true, who hold that fome Seas are lower than others; as for Example, the Red-Sea than the Mediterranean. For it being true that the Water keeps its Level, that is, holds its Superficies every where equidiftant from the Center of Gravity; or if by Accident one Part be lower, the rest, by reason of their Fluidity, will speedily reduce the Superficies again to an Equality; the Waters of all Seas communicating either above, or under Ground, or both ways, one Sea cannot be higher or lower than another: But supposing any Accident should elevate or depress any, by reason of this Confluence or Communication it would soon be reduced to a Level again, as might demonstratively be proved.

But I return, to tell the Reader what I think the most probable of all the Causes I have heard assigned of the Deluge, which is, the Center of the Earth being at that time changed, and set nearer to the Center or Middle of our Continent, whereupon the Atlantick and Pacifick Oceans must needs press upon the subterraneous Abyss, and so by Mediation thereof, force the Water upward, and at last compell it to run out at those wide Mouths and Apertures made by the Divine Power breaking up the Fountains of the great Deep. And we may suppose this to have been only a gentle and gradual Emotion, no faster than that the

Waters

Waters running out at the Bottom of the Sea, might accordingly lower the Superficies thereof sufficiently, so that none needed run over the Shores. These Waters thus poured out from the Orifices of the Fountains upon the Earth, the Declivity being changed by the Removal of the Center, could not flow down to the Sea again, but must needs stagnate upon the Earth, and overflow it; and afterwards the Earth returning to its old Center, return also to their

former Receptacles.

This Hypothesis gives us a fair and easy Solution of all the Phanomena of the Deluge, fave only the Generality of it, (making it topical, and confining it to our Continent) and delivers us from that great and insuperable Difficulty of finding eight, nay, twenty two Oceans of Water to effect it: For no less is requisite to cover the whole Terraqueous Globe with Water, to the Height of fifteen Cubits above the Tops of the highest Mountains. But because the Scripture useth general Expressions concerning the Extent of the Flood, saying, Gen. i. 19. And all the high Hills that were under the whole Heaven were covered; and again, ver. 22. All in whose Nostrils was the Breath of Life, of all that was in the dry Land, died. And, because the Americans also are said to have some ancient Memorial Tradition of a Deluge, (as credible Authors, Acosta, Herrera, and others inform us) which faith,

faith, That the whole Race of Mankind was destroyed by the Deluge, except some few that escaped: (They are the Words of Augustine Corata, concerning the Peruvian Tradition; and Lupus Gomara saith the same, from those of Mexico) And the ingenious Author of the Theory of the Earth, hath, by a moderate Computation, demonstrated, That there must be then more People upon the Earth than now: I will propose anotherway of folving this Phanomenon, and that is, by supposing that the Divine Power might at that time, by the Instrumentality of some natural Agent, to us at present unknown, so depress the Surface of the Ocean, as to force the Waters of the Abyss through the forementioned Channels and Apertures, and fo make them a partial and concurrent Cause of the Deluge.

THAT there are, at some times, in the Course of Nature, extraordinary Pressures upon the Surface of the Sea, which force the Water outwards upon the Shores to a great Height, is evident. We had upon our Coasts, few Years ago, an extraordinary Tide, wherein the Water rose so high, as to overslow all the Sea-Banks, drown Multitudes of Cattle, and fill the lower Rooms of the Houses of many Villages that stood near the Sea, so that the Inhabitants, to save themselves, were forced to get up into the upper Rooms and Garrets of their Houses. Now, how this

# Consequences, &c.

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could be effected, but by an unusual Prefure upon the Superficies of the Ocean, I cannot well conceive. In like manner, That the Divine Providence might, at the time of the Deluge, so order and dispose second Causes, as to make so strong a Pressure upon the Face of the Waters, as to force them up to a Height sufficient to overflow the Earth, is no way unreasonable to believe. But because there must be another Miracle required, to suspend the Waters upon the Land, and to hinder them from running off again into the Sea; this is far more unlikely than the former Account.

THESE Hypotheses I propose, as seeming to me, at present, most facile and consonant to Scripture, without any Concern for either of them; and, therefore, am not solicitous to gather together, and heap up Arguments to confirm them, or to answer Objections that may be made against them, being as ready to relinquish them upon better Information, as I was to admit and entertain them.



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### CHAP. III.

## Of the Effects of the Deluge.



COME now to the Third Particular proposed; that is, To Enquire concerning the Confequents of the Deluge; What considerable Effects it had up-

on the Earth, and its Inhabitants.

IT had, doubtless, very great, in changing the Superficies of the dry Land. In some Places, adding to the Sea; in some, taking from it; making Islands of Peninsula, and joining others to the Continent; altering the Beds of Rivers, throwing up lesser Hills, and washing away others, &c. The most remarkable Effects, it's likely, were in the Skirts of the Continents; because the Motion of the Water was there most violent. \* Athana- \* De Arsius Kircher gives us a Map and Descrip- ca Noa. tion of the World after the Flood, shewing p. 192. what Changes were made therein by it, or upon occasion of it afterward, as he fansies or conjectures. But because I do not love to trouble the Reader with uncertain Conjectures, I shall content myself to have faid in general, that it may rationally be supposed, there were then great Mutations and Alterations made in the superficial Part of the Earth:

# Consequences, &c.

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Earth; but what they were, though we may guess, yet can we have no certain Knowledge of: And for Particulars, referr the Curious to him.

One malignant Effect it had upon Mankind, and probably upon other Animals too, in shortning their Age, or the Duration of their Lives; which I have touched before, and shewn, that this Diminution of Age is to be attributed either to the Change of the Temperature of the Air, as to Salubrity, or Equality, (sudden and frequent Changes of Weather having a very bad Insuence upon the Age of Man in abbreviating of it, as I could easily prove) or else to the Deteriority of the Diet; or to both these Causes. But how the Flood should induce or occasion such a Change in the Air, and Productions of the Earth, I do not comprehend.



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### CHAP. IV.

Of formed Stones, Sea-shells, and other Marine-like Bodies found at great Distances from the Shores, supposed to have been brought in by the Deluge.



Nother supposed Effect of the Flood, was a bringing up out of the Sea, and scattering all the Earth over, an innumerable Multitude of Shells and Shell-fish;

there being of these Shell-like Bodies, not only on lower Grounds and Hillocks, but upon the highest Mountains, the Appennine and Alps themselves. A supposed Effect, I fay, because it is not yet agreed among the Learned, whether these Bodies, formerly called petrified Shells, but now-a-days passing by the Name of formed Stones, be original Productions of Nature, formed in Imitation of the Shells of Fishes; or the real Shells themfelves, either remaining still entire and uncorrupt, or petrified and turned into Stone, or, at least, Stones cast in some Animal Mold. Both Parts have strong Arguments and Patrons. I shall not balance Authorities, but only consider and weigh Arguments.

THOSE for the latter Part, wherewith I

shall begin, are,

First,

First, Because it seems contrary to that great Wisdom of Nature, which is observa-ble, in all its Works and Productions, to defign every thing to a determinate End, and, for the attaining that End, make use of such Ways, as are most agreeable to Man's Reason, that these prettily shaped Bodies should have all those curious Figures and Contrivances (which many of them are formed and adorned with) generated or wrought by a Plastick Vertue, for no higher End, than only to exhibite such a Form. This is Dr. Hook's Argumentation. To which Dr. Plot anfwers, That the End of such Productions is, to beautify the World with those Varieties; and that this is no more repugnant to the Prudence of Nature, than is the Production of most Flowers, Tulips, Anemones, &c. of which we know as little use of, as of formed Stones. But hereto we may reply, That Flowers are for the Ornament of a Body, that hath some Degree of Life in it: A Vegetative Soul, whereby it performs the Actions of Nutrition, Auction and Generation; which it is reasonable should be so beautified. And, Secondly, Flowers ferve to embrace and cherish the Fruit, while it is yet tender; and to defend it from the Injuries of Sun and Weather; especially, for the Protection and Security of the Apices, which are no idle or useless Part, but contain the Masculine Sperm, and ferve to give Fecundity to the Seed.

Seed. Thirdly, Though formed Stones may be useful to Man in Medicine, yet Flowers afford us abundantly more Uses, both in Meat and Medicine.

YET I must not dissemble, that there is a Phanomenon in Nature, which doth somewhat puzzle me to reconcile with the Prudence observable in all its Works, and seems strongly to prove, that Nature doth sometimes ludere, and delineate Figures, for no other End, but for the Ornament of some Stones, and to entertain and gratify our Curiofity, or exercise our Wits: That is, those elegant Impressions of the Leaves of Plants upon Cole-flate, the Knowledge whereof, I must confess myself to owe to my learned and ingenious Friend, Mr. Edward Lhwyd of Oxford, who observed of it in some Colepits in the Way from Wychester in Glocester-Thire, to Bristol; and afterwards communicated to me a Sample of it. That which he found, was marked with the Leaves of two or three Kinds of Ferns and of Harts-tongue. He told me also, that Mr. Woodward, a Londoner, shewed him very good Draughts of the common Female Fern, naturally formed in Cole, which himself found in Mendip Hills; and added, That he had found in the same Pits, Draughts of the common Cinquefoil, Clover-grass and Strawberries. But these Figures are more diligently to be observed and considered.

Dr. Woodward will have these to be the Impressions of the Leaves of Plants, which were there lodged at the Time of the gene-

ral Deluge.

Secondly, There are found in the Earth at great Distance from the Sea, real Shells unpetrified and uncorrupted, of the exact Figure and Confistency of the present natural Sea-shells, and in all their Parts like them, and that not only in the lower Grounds and Hillocks near the Sea, but in Mountains of a confiderable Height, and distant from the Sea. Christianus Mentzelius, in his Discourse concerning the Bononian Phosphorus, gives us a Relation of many Beds of them found mingled with Sand in the upper Part of a high Mountain not far from Bologna in Italy. His Words are these, Non procul monte Paterno dicto, lapidis Bononiensis patria, unico forte milliari Italico distanti (loci nomen excidit memoria) ingens mons imminet præruptus à' violentia torrentium aquarum, quas imbres frequentes ex vicinis montibus confluentes efficiunt, atque insignes terrarum moles ab isto monte prosternunt ac dejiciunt. In hac montis ruina, superiore in parte visuntur multæ strages seriesve, ex testis conchyliorum omnis generis, plurima arena interjecta, instar strati super stratum (ut chymicorum vulgus loquitur.) Et enim inter hasce testarum conchyliorum strages seriesve arena ad crassitiem ulnæ & ultra interposita. Erant autem testa variorum conchyliorum,

liorum, omnes ab invicem distincta, nec cuiquam lapidi impactæ, adeò ut separatim omnia manibus tractari & dignosci potuerint. Effecerat hoc arena pura, nullo limo lutove intermixta, que conchyliorum testas conservaverat per multa secula integras. Interea verò diuturnitate temporis omnes ista testa erant in albissimam calcem facilè resolubiles. Not far from the Mountain called Paterno, where the Bononian Stone is gotten, about an Italian Mile distant, (the Name of the Place is slipt out of my Memory) is a huge hanging Mountain, broken by the Violence of the Torrents, caused by the Confluence of Waters descending from the neighbouring Mountains after frequent Showers, throwing down great Heaps of Earth from it. In this upper Part of this broken Mountain, are seen many Beds or Floors of all kind of Sea-shells, much Sand interposing between Bed and Bed, after the manner of stratum super stratum, or Layer upon Layer, as the Chymists phrase it. The Beds of Sand interceding between these Rows of Shells, were a Yard thick, or more. These Shells were all distinct or separate one from another, and not fluck in any Stone, or cemented together, so that they might be fingly and separately viewed and handled with one's Hands. The Cause whereof was their being lodged in a pure Sand, not intermist with any Mud or Clay, which kept the Shells entire for many Ages. Yet were all these Shells, by reuson of the Length Length of Time they had lain there, easily resoluble into a purely white Calx or Ash. Fabius Columna also observes, That in the tophaceous Hills and Cliffs about Andria in Apulia, there are found various sorts of Seasshells, both broken and whole, uncorrupt, and that have undergone no Change. And Ovid in Metam. lib. 15.

Et procul à pelago Conchæ jacuere marinæ.

I am also informed, by my learned and worthy Friend, Dr. Tancred Robinson, That Signor Settali shewed him, in his Museum at Milan, many Turbens, Echini, Pearl-shells, (one with a Pearl in it) Pectunculi, and several other perfect Shells, which he himself found in the Mountains near Genoa; and afterwards, my faid Friend took notice also of feveral Beds of them himself, as he passed over Mount Cenis, above fifty Leagues distant from the Sea; he assures me, That many of the great Stones about the Buildings of London, are full of Shells, and Pieces of them. Moreover, my forementioned. Friend, Mr. Lbwyd, fent me perfect Escallop and Sea-Urchin Shells, exactly refembling the like Sea-shells, both for Figure, Colour, Weight, and Confiftency; which he himself gathered up near Oxford: And hath lately ient me word, That he found at a Place called Rungewell-Hill in Surrey, at a Village called Hedley, three Miles South of Englan,

at least twenty Miles distant from the Sea, some Fossil Oysters, which, by the Confession of Dr. Lister himself, were indeed true Oyster-shells, not petrified, nor much decayed: Nay, so like they were to Oysters newly taken out of the Sea, that a certain Person seeing them, mistook them for such, and opened one of them, expecting to find a living Fish therein.

ANOTHER the like Bed of Oyster-shells found in his own Ground, my worthy and ingenious Friend Mr. Peter Burrell, Merchant in London, gave me an Account of: Which

take in his own Words.

'I HAVE a Pit, wherein is a Bed or Vein of Oyster-shells: About two Foot under the Surface of the Earth they begin; and ' are from about a Yard to one Half-yard deep; and then succeeds a harsh Sand, that goes down two or three Yards deep, or more. In a Rivulet that runs through my Garden, half a Furlong from the foresaid 'Pit, there are of the same Shells great and fmall, not lying singly, but in great Clu-fters of great and small together, with the upper and lower Valves entire. When you open them, those that have not been exoposed to the Air, or impair'd by the Water, have a Concavity within, and a hard Mossiness sticking to the Inside of each ' Shell. Those of the Pit are amassed as hard as a Rock; and where there are K not

onot little Veins of Sand mixt with them, they break into Pieces as big as a Half-Peck: But, when expos'd to the Weather, crumble like Murle, and are good to manure Land, especially, those which have least Sand mixed with them. It's excellent to bind Walls; only, upon Thaws in the Winter-time, it relaxes a little.

I FIND, by digging in several Places, that there is a Layer or Bed of these Shells, which runs from North-West to South-East, two or three Furlongs in mine and my Neighbour's Grounds. We are 60 Miles distant from the Sea, though but 5 Miles from the River of Thames, on the Edge of Surrey, and lie high on the same Edge of Surrey, and lie high on the same Evel with Croyden." So far Mr. Burrell.

THE Place where this Gentleman lives, is at Beckenham, near Bromley in Kent, ten Miles distant from London. He sent me Samples of the Oyster-shells, exactly agreeing with the Account he gives of them. They seem to have been the Shells of real and living Oysters, and to have suffered no greater Change than they must needs do from the Nature of the Earth and Sand they were lodged in, and from the Water commixt therewith. And the Lying of them in such a Bed, is a strong Argument to prove, that this Place was some time the Bottom of the Sea, which is a thing hard to be believed.

ANOTHER Instance of such a Bed of Fossil Oyster-shells, I find in the Philosophical Transactions, N. 261. p. 485... communica-

ted by Mr. James Brewer.

'THESE Oyster-shells were found and digged up near Reading, in Berkshire. The Circumference of the Place where they have been digged up, contains (as is judged) between five and fix Acres of Land. The Foundation of these Shells is a hard rocky Chalk. The Shells lie in a Bed of green Sand, upon a Level through the whole Circumference, as nigh as can possibly be judged. This Stratum of green Sand and Oyster-shells, is (as I measured it) nigh a Foot deep. Now, immediately above this Layer or Stratum of green Sand and Shells, is a Bed of bluish fort of Clay, very hard, brittle and rugged; They call it a pinny Clay, and is of no Use: This Bed or Layer of Clay, I found to be nigh a Yard deep; and immediately above it, is a Stratum of Fullers-Earth, which is nigh ' two Foot and a half deep. This Earth is often made use of by our Clothiers. And ' above this Earth, is a Bed or Layer of a clear, fine, white Sand, without the least Mixture of any Earth, Clay, &c. which is nigh feven Foot deep. Then, immediately above this, is a stiff red Clay, ' (which is the uppermost Stratum) of which we make our Tiles. The Depth of K 2

of this cannot conveniently be taken, it being so high a Hill; upon the Top of which, ' is, and hath been dug, a little common Earth, about two Foot deep; and immediately under, appears this red Clay that they make Tiles withal. I dug (faith he) feveral whole Oysters, with both their Valves or Shells lying together, as Oysters before opened; in their Cavity was got in fome of the forementioned green Sand. . These Shells are so very brittle, that in ' digging them up, one of the Valves will frequently drop from its Fellow; but 'tis' plainly to be seen, that they were united 5 together, by placing the Shell that drops off to his Fellow Valve, which exactly corresponds; but I dug up several that were entire, nay, some double Oysters, with all their Valves united." So far Mr. Brewer.

For, that Nature should form real Shells, without any Design of covering an Animal, is indeed so contrary to that innate *Prolepsis* we have of the Prudence of Nature, (that is, the Author of Nature) that without doing some Violence to our Faculties, we can hardly prevail with ourselves to believe it; and gives great Countenance to the Atheists Assertion, That Things were made or did exist by Chance, without Counsel or Direction to any end.

ADD hereto, Thirdly, That there are other Bodies besides Shells found in the Earth, re-

fembling

fembling the Teeth and Bones of some Fishes, which are so manifestly the very Things they are thought only to resemble, that it might be esteemed Obstinacy in any Man that hath viewed and considered them, to deny it. Such are the Gloffopetræ dug up in Malta in such abundance, that you may buy them by Measure, and not by Tale: And also the Vertebres of Thornbacks, and other cartilagineous Fishes there found, and fold for Stones among the Glossopetra, which have no greater Dissimilitude to the Teeth of a living Shark, and Vertebres of a Thornback, than lying so long in the Earth, as they must needs have done, will necessarily induce. Mr. Doody has in his Custody a petrify'd Lump of Fishes, on some of which the Scales themselves still remain. And if the very Infpection of these Bodies is not enough to convince any Man that they are no Stones, but real Teeth and Bones, Fabius Columna proves it by feveral strong Arguments.

1. Those Things which have a woody, bony, or sleshy Nature, by burning are changed first into a Coal, before they go into a Calx or Ashes: But those which are of a tophaceous or stony Substance, go not first into a Coal, but burn immediately into a Calx or Lime, unless by some Vitreous or Metallick Mixture they be melted. Now these Teeth being burnt, pass presently into a Coal, but the tophous Substance adhering to them, doth K 3

not so; whence it is clear, that they are of

an offeous, and no stony Nature.

NEXT he shews, That they do not shoot into this Form after the Manner of Salts or Crystal, which I shall have Occasion farther to treat of by and by. Then he proves it from the Axiom, Natura nihil facit frustra; Nature makes nothing in vain. But these Teeth, were they thus formed in the Earth, would be in vain; for they could not have any Use of Teeth; as neither the Bones of fupporting any Animal. Nature never made Teeth without a Jaw, nor Shells without an Animal Inhabitant, nor single Bones, no not in their own proper Element, much less in a strange one. Farther he argues, from the Difficulty or Impossibility of the Generation of Glossopetræ in such Places; because, among Tophi and Stones in those dry Places, there could not be found Matter sit to make them of. But granting that, he queries whether they were generated at first all of a fudden, or grew by little and little from fmall to great, as Animals Teeth, whose Form they imitate, do. If the first be said, he demands, Whether the Tophus, out of which they were extracted, were generated before, or after the Teeth were perfected? If it be faid before, he asks, Whether there were a Place in it of the Figure and Magnitude of the Tooth, or did the Tooth make itself a Place? If the Tophus were concrete before, and with-

out a Cavity, the vegetative Power of the Stone now in Birth, could not by Force make itself a Place in the hard and folid Tophus; or if it could, and did, the Tophus must needs be rent. Against the Production of these Bodies in a compact Earth or Stone, Nic. Steno argues thus: Things that grow, expanding themselves leifurely or slowly, may indeed lift up great Weights, and dilate the Chinks and Veins of Stones, as we see the Roots of Trees sometimes do; but yet while they do thus make room for themfelves, they cannot but be often hindred by the Resistance of some hard Obstacle they meet with, as it happens to the Roots of Plants, which in hard Earth, being a thoufand ways writhen and compressed, recede from the Figure, which otherwise in soft Land they are wont to retain; whereas these Bodies, whereof we are now discoursing, are all like one another, whether they be dug out of soft Earth, or cut out of Stones, or pluck'd off Animals. Wherefore they feem not to be at this Day produced in those Places where they are found, because (as we have faid) those things which grow in compact Places are found strangely mishapen and irregular, which these are not: Nor was the Earth compacted when they were there produced for the same reason. Columna proceeds, If there were a Place before ready made in the Tophus, then was not that Fi-K 4

gure excavated in the Tophus by the vegetative Nature of the Tooth itself; but the Tophus, by its own Nature and precedent Cavity, gave the Form to the Tooth. If the latter Part be chosen, and it be said, that the Stone by its vegetative Power grew by Degrees; it may be answered as before, that could not be, because the Hardness of the Tophus could not have yielded to the vegetative Force of the Tooth, but would rather have been rent or divided by it; or rather the Tophus itfelf must have vegetated, containing a Cavity or Uterus of the Shape of the Tooth, into which an offeous Humour, penetrating through the Pores, and filling the Cavity of the *Uterus*, must there have coagulated, and taken the Form thereof, as is observed in Stones that have their Original from a *Fluor*. That both Tooth and Case might vegetate together, he denies, because in all the Teeth which he had seen, the Basis or Root was found broken, and that not with an uniform Fracture, but different in every one. Which Argument is not to be flighted, for that it shews or proves, that there was no Vegetation in the case; because in all other figured Fossils it is observed, that they are never found mutilous, broken, or imperfect. Neither can it reasonably be said or believed, that these Roots or Teeth were by some chance broken within the Tophi, but rather, that when they were cafually overwhelmed and

and buried in that tophous Earth, they were broken off from the Jaws of the Animal in those Volutations, and so in that manner mutilated. Against the Generation of these and the like Bodies in any hard Earth or Stone, N. Steno argues thus, That they are not at present produced in hard Earth, one may thence conjecture, that in all the Parts of fuch Earth or Stone throughout, they are all found of the same Consistence, and encompassed round on all Sides with that hard Matter: For if there were some of them produced anew at this present Day, the containing or ambient Bodies ought to give way to them while they are growing, which they cannot; and the Bodies themselves that are now produced, would, without doubt, difcover fomething wherein they differed from those that were generated of old. Another Argument to prove them to be true Teeth, and no Stones, he brings from their various Parts and Figures, which must else have been fo wrought and formed in vain. The Tooth being not one homogeneous Body, but compounded of Parts of a different Constitution, there must in the Formation of it be made a various Election of Humours, one for the Root, one for the inner Part, one for the Superficies of it. Then for the Figures, Magnitude, Situation or Posture, and Fitting of them; some are great, and broad, and almost triangular; others narrower and imal-

ler, others very small and narrow, of a pyramidal Figure; some streight, some crooked, bending downwards, or toward the ne-ther Side; fome inclining toward the Left, others toward the Right Side; some serrate with small Teeth, others with great Indentures, (which is observed in the lesser triangular ones) fome smooth without any Teeth, as the narrow pyramidal ones. All which Things are observed in Sharks Teeth, not only by the learned Naturalists, but also by Fishermen and Mariners. The first Row of Teeth in these Animals hanging out of the Mouth, bend forward and downward; the fecond Row are streight, especially toward the Sides of the Mouth, where they are triangular and broad, the other Rows bend downward toward the inner Part of the Mouth. Thus far \* Columna.

\* Dissert.
De GlosSopetra.

This Argument is also made use of by Agostino Scilla: 'The Apophyses also, (faith be) or Processes, in the Glossopetræ, demonstrate their Original, were there nothing else; since they exactly answer to those in Sharks Teeth, whereby every Tooth is inserted into its Neighbour in the living Animal, with those Parts porous, and those spongious, that are so in the Tooth of the Fish. Nay, whereas Sharks Teeth are mortissed into one another, in such a manner, that a Man may easily tell, which belongs to which Side, which lie near the

Throat, which near the Snout, which lie to the Right, which to the Left. And whereas, in a Shark's Jaw, the Teeth on the Left Side will not fit on the Right, nor those above serve below; so that upon seeing a Tooth, one may know which Side and what Jaw it belongs to. He hath observed every one of these things, in his Glossepetra, which punctually answer in every Part to the several Ranks of the Teeth in a living Shark.

Fourthly, If these formed Stones be indeed original Productions of Nature, in Imitation of Shells and Bones, how comes it to pass, that there should be none found that resemble any other natural Body, but the Shells and Bones of Fishes only? Why should not Nature as well imitate the Horns, Hoofs, Teeth, or Bones of Land Animals, or the Fruits, Nuts, and Seed of Plants? Now, my learned Friend, Mr. Edward Lbwyd, above mentioned, who hath been most diligent in collecting, and curious in observing these Bodies, of any Man I know, or ever heard of, tells me, That he never found himself, or had feen in any Cabinet, or Collection, any one Stone that he could compare to any part of a Land Animal. As for such that do not resemble any part of a Fish, they are either Rock Plants, as the Astroites, Asteria trochites, &c. or do shoot into that Form, after

the manner of Salts and Fluors, as the Belemnites and Selenites.

Fifthly, Those that deny these Bodies to have been the Shells and Bones of Fishes, have given us no satisfactory Account of the manner of their Production. For that they do not shoot into that Form after the manner of Salts, may be proved by many Arguments. First, All Salts that shoot, their Crystals or Concretions are of one uniform Substance; as Signor Agostino Scilla clearly demonstrates. 'Salt (saith he) is Salt as well 'within as without; A Granate and a To-' paz is a Granate and a Topaz throughout; Diamonds and Rubies are Diamonds and Rubies all over; they are Agregates of si-'milar Particles which compose the whole 'Mass, be it greater, or be it less: Where-'as, Glossopetra, for Example, like all other vegetating Substances, are made up of various and diffimilar Corpuscles, put toge-'ther in fuch a manner, as is peculiarly fub-' fervient to the End for which they were 'made: Accordingly, the Cortex is of one 'Substance, the Medulla of another, and that lodged in proper Cells, the Root di-'s stinct from them both." In other Bodies that shoot, as the Pyrites and Belemnites, one may observe streight Radii or Fibres proceeding from one Center. Secondly, Did those Bodies shoot into these Figures, after the manner of Salts, it feems strange to

me, that two Shells should be so adapted together at the Heel, as to shoot out to the same Extension round, and the upper and nether Valve be of different Figure, as in natural Shells. Thirdly, Were these Bodies produced in the manner of saline Concretions, it's strange there should be such Varieties of them, and their Shapes fo regular, and exactly circumscribed: So great a Diversity of Figures, arguing a greater Variety of Salts, or of their Modifications and Mixtures, than are likely to be found in Nature; and the Concretions of Salts never, that I have yet feen, appearing in that Regularity of Figure, and due Circumscription, as in these Bodies. This Argument, Steno, in his Discourse concerning these Bodies, improves and urges thus; 'Who can deny, that the hexaedrical ' Figure of Crystal, the Cubes of Marcasites. ' and the Crystals of Salts in Chymical Opcrations, and infinite other Bodies coagu-' lating and crystallizing in a Fluid, have Figures much more ordinate than are ' those of Scallops, Cockles, and other Bivalves, ' and also Periwinckles and Turbens? Yet we fee, in these simple Bodies, sometimes ' the Top of a solid Angle cut off; some-' times many of them, without any Order, ' sticking one to another; sometimes their ' Planes differing among themselves, in Mag-' nitude and Situation; and many other Ways receding from their usual Figure: " Which

Which being fo, how much greater and more notable Defects must there needs have been in Bodies that have a far more compound Figure, fuch as are those which ' imitate the Forms of Animals, if they were 'in like manner generated? Seeing, therefore, in these Bodies, which are very much compounded, these Defects do seldom occurr, which in those other most simple Bodies, are very frequent; seeing there are ono Defects observed in these compound Bodies, the like whereto are not in like mane ner seen in the Bodies of Animals: And feeing that wherefoever they are found, they are exceeding like both among them-' selves, and to the Parts of Animals, it is very unlikely they should shoot into those ' Figures after the manner of Salts; but on the contrary, highly probable that they were originally the Parts of Animals; the Similitude of Conformation in their Pores, Stria, Hinges, Teeth, Prominences, Threds, 6 Gc. almost necessarily inferring a Similitude of Original; which is an Argument of the Government of some Principle, sue periour to Matter figured and moved, in their Formations."

Fourthly, Were these Bodies nothing but Concretions of Salts, or saline Mixtures, it seems no less strange, that so many Liquors impregnated with all sorts of Salts and Mineral Juices, in all Proportions, having been at one time or other industriously or accidentally exposed to crystallize, and let stand long in Vessels, there should never have been found in them any such Concretions. For if any had happened, we should, doubtless, have heard of them, and the Observers would have improved such an Experiment to the Production of the like Bodies, at their Pleasure.

Two farther Arguments, to prove that these Bodies were not primary Productions of Nature, the forementioned Signor Scilla affords us. 'Nature (says he) sometime's ' produced monstrous and defective Things. 'An Animal ibmetimes wants a Limb; A 'Tree is without some principal Branches; 'A Fruit may want some of its chiefest Parts. Yet still we may observe, that Na-' ture covers that Defect with a Skin, or Bark, or Rind, fo that it never appears torn off, or rent, to the naked Eye, as it would, if it were torn off by a Hand, or cut off with a Knife. This is Nature's confant Course; which evidently shews, that 'lusus Natura (as these are erroneously ' called) were never produced in the Earth; 6 fince all the Bruises and Fractures which they have met with, are apparent, without ' any Difguise to hide them; such as Nature always employs to hide the Defects of her own irregular Productions."

But this may be folved, by faying, that these Fractures and Bruises happened to them, after they were perfectly formed, and, as I may so fay, out of Nature's Hands; and so, Nature not concerned to cover their Defects.

Secondly, All the Echini, or other Land-Shells, which he found upon the Calabrian or Messineze Hills, or had been brought him from Malta, were bruised by a perpendicular Pressure, which he explains thus: 'The ' Crust of all Echini has two Centers, one ' directly opposite to the other; so that if they happened to lie in the liquid Mud, in fuch a manner as that the lowest Center was perpendicular to the Horizon, they were bruifed so as not to lose their circu-' lar Figure, only they were much compres-' sed. If they lay on one Side, they were ' squeezed out of that Shape, and the Membranes of the Ligatures parted from each other variously, according to the Situation of these Shells in the Mud, at that Time. ' All which plainly shews, that as the Mud ' dried, the superincumbent Weight pressed e perpendicularly upon the enclosed Bodies, which were then compressed together in that Posture they happened to be in; and were more or less compressed, according as the Mudgot into their Cavities, in greater or lesser Quantities; and, as it dried, propped them up on the Inside, against the

So far Scilla. By all which it appears, That these Shells were not formed in the Mud where they lay, but precedently in the Sea; and were, by extraordinary Tides or Inundations of the Sea, thrown up together with the Mud; which else would not have had

those Effects upon them.

As for what may be objected out of Sir John Narborough's Voyage; 'That the Hills' round about Port S. Julian, are full of Beds of great Oyster-shells, which could not come (saith he) from the Sea or Flood, because there is no such Shell-Fish in those Seas or Shores." I answer, That there might be such in the Seas thereabout, although it was not Sir John's Hap to meet with them, or else they might be brought, by tempestuous Wind, from a great way off, as were those Shells brought into Calabria, which we have before mentioned out of Ago-stilla.

So I have finished what I have to alledge, in Defence of the latter Part, That these formed Stones were sometimes the real Shells or Bones of Fishes, I mean the figured Part

of them.

I proceed now to set down, what may be objected against this Opinion, or offered in Assertion of the contrary, viz. That these Bodies are Primitive Productions of Na-

ture, in Imitation of the Shells and Bones of Fishes.

AGAINST the former Opinion we have been pleading for, it may be objected, That there follow fuch strange and seemingly absurd Consequences from it, as are hardly reconcileable to Scripture, or indeed to sober

Reason. As,

First, That the Waters must have covered the whole Earth, even the highest Mountains, and that for a long time, there being found of these Shells, not only in the most mountainous Parts of our Country, but in the highest Mountains in Europe, the Appennine and Alps themselves, and that not only scattered, but amassed in great Lumps, and lying thick in Beds of Sand, as we have before shewn. Now, this could hardly be the Effect of a short Deluge, which if it had carried any Shell-Fish so high, would in all Likelihood have fcattered them very thin. These Beds and Lumps of them necessarily inferring, that they must have bred there, which is a Work of Time. Whereas the general Deluge, from the Beginning to the End, lasted but ten Months and thirteen Days: That is, from the seventeenth Day of the fecond Month of the fix hundredth Year of Noah's Life, when the forty Days Rain began, till the first Day of the first Month of the fix hundred and first Year thereof, when the Waters were dried up from off the Earth. Neither

Neither is it less repugnant to Reason than Scripture; for if the Waters stood so high above the Earth, for so long a time, they must, by reason of their Consuence, be raised as high above the Sea too. But what is now become of this huge Mass of Waters, equal to fix or seven Oceans; nay, to twenty or more? May not the Stoicks here fet in, and help us out at a dead Lift? The Sun and Moon, say they, might possibly sup it all up. Yea, but we cannot allow Time enough for that; for according to the moderate Draughts they take now-a-days, one Ocean would suffice to water them many Ages, unless perchance, when they were young and hot, they might need more Drink. But to be ferious, I have no Way to answer this Objection, but by denying that there are any Beds or great Lumps and Masses of these formed Stones to be found near the Tops of the Alps, or other high Mountains; but yet there might be fome particular Shells scattered there by the general Deluge. Unless we should say, that those Mountains, where such Shells are found, were anciently depressed Places, and afterward raised up by Earthquakes, or subterraneous Fires. Another thing there is as difficult to give an Account of, as of the Shells getting up to the Tops of Mountains; that is, of those several Beds or Floors of Earth and Sand, &c. one above another, which are observed in broken Mountains: For one

cannot eafily imagine, whence these Floors or Beds, in the Manner of strata super strata (as the Chymists speak) should come, but from the Sediments of great Floods, which how or whence they could bring fo great a Quantity of Earth down, when there was but little Land above the Sea, I cannot fee. And one would likewise be apt to think, that fuch a Bed of Sands, with plenty of Cockle-Shells intermixt, as we mentioned before in the Mountain near Bononia in Italy, must have been sometimes the Bottom of the Sea. But before one can give a right Judgment of these Things, one must view the Mountains where fuch Layers and Beds of Earth and Shells are found; for perchance they may not be elevated fo high above the present Surface of the Sea, as one would judge by the Descriptions of them. 'Tis true (says my worthy Friend Dr. Tancred Robinson) that some Shells might have been scatter'd up and down the Earth by Incampments of Armies, by the Inhabitants of Cities and Towns, whereof there are now no Remains. Monsieur Loubere, the late French Envoy to Siam, affirms, That the Monkeys and Apes, at the Cape of Good Hope, are almost continually carrying Shells and other Marine Bodies from the Sea-Side up to the Mountains; yet this will not solve the Matter, nor give any satisfactory Account, why these perfect Shells are dispers'd up and down the Earth, in all Climates and Regions. Regions, in the deep Bowels of vast Mountains, where they lie as regularly in Beds, as they do at the Bottom of the Sea. This to me, I confess, is at present unaccountable.

Secondly, It would hence follow, That many Species of Shell-Fish are lost out of the World, which Philosophers hitherto have been unwilling to admit, esteeming the Destruction of any one Species a dismembring of the Universe, and rendring it impersect; whereas they think the Divine Providence is especially concerned to secure and preserve the Works of the Creation: And that it is so, appears, in that it was so careful to lodge all Land-Animals in the Ark at the Time of the general Deluge. The Consequence is proved, in that, among these petrified Shells, there are many Sorts observed, which are not at this Day, that we know of, any where to be found. Such are a whole Genus of Cornua Ammonis, which some have supposed to be Nautili (to which indeed they are nearly akin, but yet differ from them so much, that they ought to be accounted a distinct subaltern Genus, as I shall shew out of Dr. Plot by and by) which there have not any been seen either cast ashore, or raked out of the Sea, at any time, that ever I heard of. Nay, my very learned and honoured Friend - Dr. Lister proceeds farther, and saith, That when he particularly examined some of our English Shores for Shells, and also the fresh Waters Waters and the Fields, that he did never meet with any one of those Species of Shells found at Adderton in Yorkshire, Wansford-Bridge in Northamptonshire, and about Gunthorp and Beavoir-Castle, &c. any where else, but in their respective Quarries. What can we say to this? Why, it is possible that many Sorts of Shell-Fish may be lodged so deep in the Seas, or on Rocks so remote from the Shores, that they may never come to our Sight.

Thirdly, It follows also, that there have been Shell-Fish in these cold Northern Seas, of greater Bulk and Dimensions than any now living; I do not say in these, but in the most Southernly and Indian, viz. Cornua Ammonis, of two Foot Diameter, and of Thick-

ness answerable.

To this I answer, That there are no petrified Shells that do in Bigness much exceed those of the natural Shell-Fish found in our Seas, save the Cornua Ammonis only, which I suspect to have never been, nor had any Relation to any Shells of Fishes; or to imitate or resemble them, at least some of them. Against this Assertion it may be objected, That there are found in England many Pestinites bigger than any Shell-Fish of that Kind which our Seas now afford. And that there are no Nautili, or other testaceous Fishes with us, comparable in Bigness to that Nautilus Stone of twenty eight Pound sound by Mr. Waller at Keinsham. To which I answer,

fwer, That there may be Shell-Fish in our Seas, that do not at all, or very feldom appear, greater than we are aware of. I myfelf, in Company with Mr. Willughby, in the Streight between the Isle and Calf of Man, took up among the tall Fuci growing thick upon the Rocks there, two or three of those large Echini Marini, or Sea-Urchins, as big as a Man's two Fists, the Shells whereof we never found cast up upon the Shores of England, nor ever heard that any Man else did. So that I question not, but there are lodged among the Rocks, and in the deeper Places of the Sea, remote from the Shores, many different Sorts of Shell-Fish, and excelling in Magnitude those that are commonly found or known. And like enough it is, that after the Flood there were many Places deferted, and thrown up by the Sea, and become dry Land, which had been Sea before; which must needs be replete with these Bodies. As for the Nautili, they are much different from these Cornua Ammonis: For the Nautili, at least all the Species of them known to us, are (as Dr. Plot well observes) extravagantly broad at the Mouth, and have not more than two other small Turns at the most, whereas the Turns of the Ophiomorphites are proportionable one to another; and in Number many times four or five, and fometimes fix, if we may believe Aldrovand. And there are Nautili Lapidei, which do as L4 nearly.

nearly refemble the Nautilus Shells, as any other Cochlites do their respective Prototypes, as Mr. Lhwyd affures me he had obferved many in Museums. And the learned and ingenious Mr. Richard Waller, then Secretary to the Royal Society, in a Letter to me dated Febr. 4 .--- 87. writes, That he had been lately at Keinsham in Somersetshire, and making a Search after the Cornua Ammonis, found one of the true Nautilus Shape, covered in some Places with a shelly Incrustation, with the Diaphragms to be feen to the Center of the Voluta, and in each Diaphragm, the Hole by which they communicate one with another, by a String or Gut in the Fish. This was of a very hard Stone and large Size, weighing at least twenty eight Pound, though some part was broken off. Another Argument that they have no Relation to the common Nautili, is, that they break into Pieces somewhat resembling Vertebres, as I was first advised by the fore-remembred Mr. Lbwyd, and have fince noted myfelf. I also received from that very ingenious and inquisitive Gentleman, happy in making natu-ral Discoveries, Mr. William Cole of Bristol, fuch an Account of a Sort or two of these Ophiomorphous Bodies, as is enough to stagger any Man's Belief, if not utterly to overthrow his Opinion of their owing their Original to any Sea Shell, which take in his-Words: Among others of this Kind of Bodies which I bave have observed. I shall instance in one, which can be reduced to none but the Ophiomorphites, which I found growing between the thin Plates of a kind of brittle blue Slate in large Rocks, some a Furlong within the full Sea-Mark, and in some where the Water comes not at highest Tides, only in great Storms, when the Waves break, it is dash'd sometimes against them, being forced up by the Winds; which being broken with a convenient Tool, will shiver all into very thin Plates; between which I have found in abundance of those Stones, but as brittle as the Slate in which they grew, and of the same Consistence; but so thin, that the broadest, being about four Inches, are not fo thick as a Half-Crown Piece, some not half an Inch broad, were as thin as a Groat, and so proportionably up to the largest, covered with a Superficies as thin, and exactly of the Colour of Silver-toil: And where the Sea-water washeth them, and they are exposed to the Sun and Wind when the Tide is gone, they are tarnished, and appear of a Gold, Purple, Blue and Red; as any thing on which Silver-foil is laid, being exposed a considerable time to the Sun, Wind, and Weather, will do. These have the same Spiral Figures, and as regular as the other Serpent-Stones, and being taken off with a Knife, leave the same Impressions on both Sides of the Slate.

In some such Rocks of Slate, but much harder, I found some of those Stones of another

Kind,

Kind, thick in Proportion to their Breadth, from an Inch to twenty eight Inches broad; the broadest one was at the great End (on which some Authors have fabulously reported the Head to grow) six Inches thick; all of them covered over with a white Scale, which will be taken off, one Coat under another, as Pearls, or the Shells of some Fishes. I saw some Impressions as big as the Fore-Wheel of a Chariot, &c. What shall we say to this? Were there ever any Shell-Fish in ours, or other Seas, as broad as a Coach-Wheel? others as thin as a Groat? What is become of all this kind of Ophiomorphite Shell-Fish? And yet (which is strange) both these Kinds, by Mr. Cole's Description, seem to have been covered with Shells.

By what I have said concerning these Ophiomorphous Stones not to have been Nautili, I would not be thought to restect upon, or detract from the Veracity or Exactness of the Observations of Dr. Robert Hook, whom for his Learning and deep Insight into the Mysteries of Nature, I deservedly honour. I question not, but he found in the Keinsham Ophiomorphites, perfect Diaphragms of a very distinct Substance from that which silled the Cavities, and exactly of that kind which covered the Outside, being for the most part whitish, or Mother of Pearl coloured. Mr. Waller fore-mentioned, attests the same, writing in his Letter to me of Febr. 4. 1687.

that

that in the ordinary Snake-Stones there, the fhelly Diaphragms were very visible. In this respect they do resemble Nautili; though for their Figure they are much different, and of a distinct Genus. I never broke any of the Keinsham Stones, but of those found about Whithy in Yorkshire many; but could not observe in them any Shell-like Diaphragms, only they broke into fuch Pieces as I mentioned before. And my dear and much honoured Friend, Dr. Tancred Robinson, writes me, That he had broken several Cornua Ammonis, but could never find any Diaphragms or Valves in them, though he confesseth Mr. Woodward shew'd him one with such, in his curious Collection of Petrifactions. So that these Diaphragms are not to be found in all the Sorts of them. But if they be found in some, it is a strong Presumption, that they were at first in all, however they came to disappear.

UPON farther Consideration, I find Reafon to agree with Dr. Hook, and other Naturalists, That these Cornua Ammonis are of the same Genus with Nautili, and differ only in Species. But yet these Species are subaltern Genera, each having divers Species under it.

In fine, these Ophiomorphous Stones do more puzzle and confound me, than any other of the formed Stones whatsoever, because, by Dr. Hook's Description of those of Keinsham, they seem to have been, or to

owe their Original to Shells; and yet there is nothing like them appears at this Day in our or any other Seas, as far as I have feen,

heard, or read.

To this may be answered, as Scilla doth to the like Objection against the Maltese Shells, Gc. And whereas it is objected, ( (faith he) that great Quantities of Shells are found in Malta which are foreign to s those Seas, that is of no Force, since it is well known, that every Easterly and South-Easterly Wind throws whole Beds of beau-'tiful Shells upon the Calabrian Coast, none of which Kind of Shell-Fish are taken by ' Fishermen in those Seas." The same Anfwer he returns to the Objection of the Echini Spatagi, being very rarely feen about Malta, and yet that great Numbers of the Shells of that Species of Echinitæ have been found there, viz. That he himself, in less than an Hour's time, hath taken them up by hundreds in the Port of Messina, where that sort of Shell-Fish is as rarely to be found as at Malta.

In like manner, these Cornua Ammonis, though altogether Strangers to our Seas, might as well be brought higher by Force of Winds or Stress of Weather, much more than by the general Deluge, in which the Fountains of the great Deep were broken up. Especially if we consider, that several East-India Fruits have been brought over the

vast Ocean, and cast upon the Western Islands of Scotland.

Thirdly, A fecond Argument to prove these formed Stones never to have been Shells, Dr. \* Plot affords us, 'Because that e- \* Hist. 'ven those Shells, which so exactly represent Nat. Oxf. fome forts of Shell-Fish, that there can be no p. 117. 'Exception upon the account of Figure, but that they might formerly have been Shells 'indeed, at some Places are found only with one Shell and not the other. Thus in Cowley "Common [in Oxfordshire] we meet only with the gibbous, not the flat Shell of the petri-'fied Oyster, and so of the Escallop-Stones in the Quarries near Shotover; which if they had once been the Shells of Oysters and Escal-'lops, had scarce been thus parted." To this I answer, That this Argument is not necesfarily conclusive, because there may possibly be some reason of it, though we know it not, nor can eafily imagine any. The like Answer may be returned to his next Argument.

Thirdly, 'Because (saith the Doctor) I can by no means satisfy myself, how it should come to pass, that in case these Bodies had once been moulded in Shells, some of the same Kind should be found in Beds, as the Conchites at Langley, Charlton, Adderbury, and others scattered, as at Glypton, and Teynton, and so the Ostracites at Shotover and Cowley. Nor how it should

## Consequences of

should fall out, that some of these Bic valves should always be found with their

Shells separate, as the Ostracites and Pe-etines: And others always closed toge-

ther, as the Conchites in all Places I have

vet seen.

Fourthly, 'Because many of these formed Stones seem now to be in sieri, (which is the Doctor's next Argument) as the · Selenites at Shotover and Hampton-gay, the Conchites of Glympton and Cornwall, ma-iny of which were of a perfect Clay, and others of Stone, Ge." As for the Sele-nites, I grant them to have been in fieri, because they are formed after the manner of Salts by Shooting or Crystallization; but concerning the Clay Cockles, I fay with the Civilians, ampliandum. Since the publishing of this Treatise, happening to read Dr. Nicol. Steno's Discourse concerning these Bodies, in his Description of a Shark's Head, I met with a very plausible Solution of this Argument or Objection. First, he gives us the History of these Bodies, or his Observations concerning them; of which these following are two: 1. That in Argilla, which some English, Potters Earth, and we may render a fat Clay, he had taken Notice that there were Plenty of them on the Superficies of the Earth, but within the Earth but a few. 2. That in the same Argilla, the deeper you descend downward, the more tender those **Bodies** 

Bodies are, so that some of them at any the least Touch fall into Powder: And they also that were on the Superficies, almost all of them were without much ado reduced into a white Powder. Now (faith he) feeing in fuch kind of Earth, by how much deeper those Bodies lie, by so much the softer they are, and do less bear the Touch, the Earth is so far from producing them, that it doth rather destroy them. Neither is there any reason to think, that they are therefore softer, because they are not yet arrived at their Perfection, or come to Maturity: For those Things that are foft upon that account, while they are in generating, have their Parts united to one another, as it were by a kind of Glue (as is seen in the tender Shells of Pine-Nuts or Almonds) but these Bodies, being deprived and destitute of all Glue, easily moulder to Dust. Nor is it any Objection against our Opinion, that on the Surface of the Earth their Number seems to increase, for that is owing to Rains washing away the intermediate Earth; but rather their Consistence when they are on the Superficies, being tender and easily crumbled into Dust, doth demonstrate, that their Destruction, begun in the Earth, was interrupted by the Intervention of the Rain. But to give these Arguments their Due, tho' they be not demonstrative Proofs, yet they inferr a great Degree of Probability, and shrewdly urge and thake the contrary Opinion.

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THE other Arguments the Dostor alledges, admit a plausible Solution, excepting such as we have already touched, and given as good an Answer to, as either the Matter will

admit, or we were able to give.

To the first, That there are found Stones resembling Shell-Fish that stick to Rocks: I answer, That many of them might, by Accident, be rubb'd off the Rocks they stick to, or thrust off by Birds insinuating their Bills between the Shell and Rock, to feed upon their Meat; but by what means soever it be, that they are sometimes broken off, the Matter of Fact is certain; for we find many Patella cast upon the Shores by the working of the Sea; Why then might they not be brought

up by the Flood?

To the second, Why might not the Bones of Whales, Sea-Horses, all squamose Fishes, the great Shells of the Buccina, Murices, Concha Veneris, and Solenes, and almost all the crustaceous kind, as Crabs and Lobsters, &c. as well have been brought up and left behind by the Flood, and afterward petrisied, as any of the testaceous kind? I answer, Of the great Buccina, Murices and Concha Veneris, there are very sew or none sound in our Seas: It may be there are of them in the Mountains and Quarries of the Indies, were any Man so curious as to search them out: Though it's likely but sew, because being great Things, easy to be seen, and that Part

of the World having been fully peopled foon after the Flood, their Beauty might invite the Inhabitants to fearch them out, and gather them up. But, Secondly, Those other Kinds may possibly be less durable, and more apt to be wrought upon, to moulder, decay, and be dissolved in time by the Weather, Rains and Moisture of the Earth, or were not so susceptive of petrifying Juices.

THE Third Argument is already answered

in the precedent Discourse.

To the Fourth Argument, as to what concerns the Selenites, Astroites and Belemnites, we have answered already. That the Species of Brontia cannot be the petrified Shells of Echini Spatagi, the Arguments the Doctor alledges out of Aristotle and Rondeletius do not evince. For though in some Seas they may be πελάγοι καὶ σπάνιοι, yet in others are they plentiful enough. In our own Seas, at Llandwyn in the Isle of Anglesey, we may reasonably conjecture, they are more plentiful than the common Echini any where with us; because we found more of their Shells cast up there on the Shore, than of the Echini in any Shore about England: Nay, so common are they there, that even the Vulgar have taken Notice of them, and imposed a Name upon them, calling them Mermaids Heads. And tho' their Bristles or Prickles were but small, yet were they not few or thin set, as Rondeletius saith.

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How the Snake-Stones about Huntly-Nab in Whithy in Yorkshire came to be included in Globular or Lenticular Stones, is not difficult to make out; for the Cliffs thereabout being Allom-Stone or Mine, wherein these Snake-Stones lie, the Sea in Spring-Tides and tempestuous Weather undermines and throws down Part of the Shore or Cliffs, which by the Fall break in Pieces, and the Ophiomorphous Stone being harder than the rest of the Cliff, is broken off from it by the Fall, or its Volutation in the Sea afterward, with some Part of the Cliff or Allom-Stone sticking to each Side of it where it is concave, and by reason of its Figure and Stria, cannot

eafily part from it.

Lastly, To dissemble nothing, I have my-felf observed some Cockle-Stones to have seemingly different Impressions or Striæ upon the same Superficies; which Phanomenon it is very hard to give an Account of. I have also observed a large Stone almost as hard as Marble, that was so marked every where throughout with the Impressions of Cockles and their Striæ, so crossing one another in every Part of it, that if it were nothing but Shells amassed together by a stony Cement, those Shells must have, before their Concretion, been broken into infinite small Pieces or Fragments, scarce any remaining entire; which I do not see how any Floods, or Working of the Sea, could possibly effect.

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So I have finished what I had to say concerning this supposed Effect of the Deluge, the Bringing in of Shells, and Scattering them all over the dry Land. But yet I must not dismiss this Particular, till I have said something to an Objection that presently occurrs to any one who considers this Matter. The Waters of the Flood having been supplied, partly by Rains, partly by the Breaking up of the Fountains of the great Deep, and not by an Irruption or Inundation of the Sea, how could any Sea-Shells at all be brought

in by it?

To this I answer, That the great Deep communicates with the Sea; and the Waters rifing up out of the fubterraneous Abyfs, the Sea must needs succeed, else would there have been an empty Space left in the Middle of the Earth, fo that the Shell-Fish might as well come in this Way from the Bottom of the Sea, as by an Inundation: In like manner, as the Fish in the Lake of Carniola, called the Zirchnitzer Sea, do descend annually under Ground through many great Holes in the Bottom, and return again by the same Holes. To all this I might add, that into the Lands near the Skirts of the Sea, and lower Hills, these Shells might in part be brought by particular Floods, of which many we read of, and more possibly than are recorded in any History, may have happened fince the general Deluge. Hence the chief Champions of the Opinion M 2

of Mock-Shells are not difficult to grant, that in some Countries, and particularly along the Shore of the Mediterranean-Sea, there may all manner of Shells be found promiscuously included in the Rocks or Earth, and at good Distances too from the Sea. Which are the Words of Dr. Lister, repeated and approved by Dr. Plot. But this will not ferve their Turn; for we have before proved, that in the middle Part, and near the Center of our own Country, at a great Distance from the Sea, viz. in Oxfordshire, there are found not only Shell-like Stones, but real Shells, or Mock-Shells, (as some esteem them) for Figure, Colour, Weight, Consistency, or any other Accident, not to be distinguished from true Shells; and that not fuch as have been accidentally scattered there, but digg'd out of the Ground in Plenty, and of Fishes that are rarely found in our Seas: Patterns whereof were fent me by my ingenious Friend Mr. Lhwyd, who, I hope, will, e'er long, gratify the Curious, by publishing a general Catalogue of all the formed Stones found in England, and his Remarks upon them.

And I have likewise proved by good Authority, that beyond the Seas, in high Mountains, and many Leagues distant from the Sea too, there have been Beds of real Shells. I might have added Sharks Teeth, or Glossopetra, as both Goropius Becanus, and Georgius Agricola, testify; if not in Beds, yet plen-

tifully

tifully dispers'd in the Earth. There are several Medical Histories extant (as Dr. Tancred Robinson informs me) of perfect Shells found in Animal Bodies, in whose Glands they were originally formed, which is a considerable Objection, not easily to be removed.

DR. Woodward, and others, suppose these Shells, and other Bodies, to be disposed and ranged in the Earth according to their specifick Gravity; and for the solving or giving an Account of this Phanomenon, hath advan-

ced a strange and bold Hypothesis.

DURING the Time of the Deluge, ( (faith he) whilst the Water was out upon, and covered the terrestrial Globe, all the Stone and Marble of the Antediluvian ' Earth, all the Metals of it, all Mineral Concretions, and, in a word, all Fossils whatfoever, that had obtained any Solidity, were totally dissolved, and their constituent 'Corpuscles all disjoined, their Cohæsion perfectly ceasing. That the said Corpuscles of these solid Fossils, together with the Corpuscles of those which were not before solid, fuch as Sand, Earth, and the like; as also Animal Bodies, and Parts of Animal Bones, Teeth, Shells; Vegetables, and Parts of Vegetables, Trees, Shrubs, Herbs; and to be short, all Bodies whatsoever, that were either upon the Earth, or that constituted the Mass of it, if not quite down to the Abyss, yer, at least, to the greatest Depth M 3

Depth we ever dig: I say, all these were assumed up promiscuously into the Water, and sustained in it in such manner, that the Water and Bodies in it together, made up

one common confused Mass.

THAT, at length, all the Mass that was, thus borne up in the Water, was again precipitated, and subsided towards the Bottom: That this Subsidence happened generally, and as near as possibly could be expected in so great a Confusion, according to the Laws of Gravity: That Matter, Body, or Bodies, which had the greatest Quantity, or Degree of Gravity, subsiding first. in Order, and falling lowest: That which ' had the next, or a still lesser Degree of Gravity, subsiding next after, and settling upon the precedent, and so on in their several Courses: That which had the least Gravity not finking down till last of all, fettling at the Surface of the Sediment, and covering all the rest: That the Matter fubfiding thus, formed the Strata of Stone, of Marble, of Cole, and the rest; of which Strata lying one upon another, the terreftrial Globe, or at least as much of it as is ever displayed to View, doth mainly con-'fist: The Strata being arranged in this Order, meerly by the Disparity of the Matter of which they confifted, as to Gravity, .... and there being Bodies of quite different Kinds, Natures and Constitutions, ' that

that are nearly of the same specifick Gravity, it thence happened, that Bodies of quite different Kinds subsided at the same instant, and fell together into, and composed the same Stratum: That, for this Reason, the Shells of Cockles, Escallops, Periwinkles, and the rest, which have a greater Degree of Gravity, were enclosed and lodged in the Strata of Stone, Marble, and the heavier Kinds of terrestrial Matter; the lighter Shells not sinking down till afterwards, and so falling among the lighter Matter, as Chalk, and the like, Gc." This being the Main of his Hypothesis; for the rest I referr to the Book.

I SHALL not at present examine it, but respite that Task till the Publication of his larger Work, wherein we expect it will be confirmed, and all Difficulties cleared up. I
shall only add, that we have sufficient Authorities to prove, That that Phanomenon, for
the solving whereof, I suspect he invented
this Hypothesis, viz. That these Bodies are
arranged and lodged in the Beds, according
to their specifick Gravity, is not generally
true; but that they are often mingled heavy
with Light in the same Bed or Stratum.

REFLECTING upon the Length of this Discourse concerning the Original of these Bodies, I am suspicious that the vulgar and inconsiderate Reader will be ready to demand,

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mand, What needs all this ado? To what purpose so many Words about so trivial a Subject? What Reference hath the Consideration of Shells and Bones of Fishes petrified to Divinity? Wherefore I shall, in a few Words, shew the great Importance of this Disquisition, concerning formed Stones, and the De-

termination of their Original.

FOR, First, If we adhere to their Opinion, who hold them to have been original Productions of Nature, in imitation only of the Shells and Bones of Fishes; we put a Weapon into the Atheist's Hands, affording him a strong Argument, to prove, that even Animals themselves are casual Productions, and not the Effects of Counsel or Design. For, to what End are these Bodies curiously figured and adorned? If for no other, but to exhibit such a Form, for the Ornament of the Universe, or to gratify the Curiosity of Man; these are but general Ends: Whereas the Parts of every Species of Body are formed and fitted to the particular Uses and Conveniences of that Body. And if Nature would delineate or imprint Figures upon Bodies, only to be Spectacles to Man, one would think it should not have made choice of those of the Shells and Bones of Fishes, but rather of such as were absolutely new and different from any frequently feen, or belonging to Animals; which serve rather to amuse than delight him. But, Secondly, We find in the

Earth, not only Stones formed in Imitation of Shells, but real Shells, Teeth and Bones of Fishes, or Bodies so like them, that they are not to be distinguished by Figure, Texture, Colour, Weight, or any other Accident. Now, what greater Argument can the Atheist desire, to prove, that the Shells of Fishes were never designed by any provident Efficient for their Defence, or their Bones for the fustaining of their Bodies, but that the Fish and Shell containing it, and the Bones fustaining it, did casually concurr; than that there should be real Shells produced without any Fish in them, and that in dry Places, where no Fish ever did or could breed, or indeed live, and real Fish-Bones, where there never was nor could be any Fish?

Dorn it not then concern a Divine to be acquainted with this Objection against the Bodies of Animals being the Effects of Counsel and Design, and provided with an Answer to it. For my part, I must needs confess, that this Argument weighs so with me, whether from that innate Prolepsis myself, and I think most other Men, have of the Prudence of Nature in all its Operations, or from mine own observing that in all other things, it acts for Ends, that it is alone sufficient to preponderate all the Arguments for the contrary Opinions, tho' I acknowledge them to be of great Force, and hard to be answered; and to incline, or rather constrain

me to allow, that these Bodies were either real Bones and Shells of Fishes, or owe their Figure to them. I cannot (to use the Words of F. Columna) prevail with myself to believe, that Nature ever made Teeth without a Jaw, or Shells without an Animal Inhabitant, or fingle Bones, no not in their own proper Element, much less in a strange one. Who even of the Vulgar, beholding any considerable Part of an Animal which he fees not the Use of, is not apt presently to ask what it serves for, as by that innate Prolepsis I mentioned before, presuming it was not made in vain, but for some End and Use. Suppose any of us should find in the Earth the complete Skeleton of a Man, he must be as credulous as the Atheist, if he could believe that it grew there of itself, and never had Relation to any Man's Body. Why then should we think that the entire Skeletons of Fishes, found sometimes in the Earth, had no other Original? nor ever were any Part of living Fishes.

Secondly, If we choose and embrace the contrary Opinion, viz. That these Bodies were the real Shells and Bones of Fishes, or owe their Figures to them, we shall find that this also is urged with many and almost insuperable Difficulties, the Principal of which I have already produced, and shall here omit, repeating only two that referr to Divinity.

I. THESE

T. THESE Bodies being found dispersed all over the Earth, they of the contrary Opinion demand how they come there? If it be answered, That they were brought in by the general Deluge, in Contradiction thereto they argue thus: If these Stones were found scattered singly and indifferently all the Earth over, there might be indeed some reason to imagine that they were brought in by the Flood; but being found in some particular Places only, either lying thick in great Beds of Sand and Gravel, or amassed together in huge Lumps, by a stony Cement, such Beds must in all Likelihood have been the Effect of those Animals breeding there for a considerable time; whereas the Flood continued upon the Earth but ten Months and thirteen Days, as I have before shewn; and yet there are found of these Bodies upon very high Mountains, not excepting the Appennine and Alps themselves. Whence they conclude, that they were neither brought in by the Flood, nor bred during the Flood, but some other way produced. For if they were the Shells of Fishes, or their Bones, the Water must needs have covered the whole Earth, even the Mountains themselves, for a much longer Time than is consistent with the Scripture History of the Flood, and therefore we must seek some other Original of these Bodies.

If we stick to the Letter of the Scripture History of the Creation, that the Creation of Fishes succeeded the Separation of Land and Sea, and that the six Days wherein the World was created, were six Natural Days, and no more; it is very difficult to return a satisfactory Answer to this Objection: I shall therefore only add a Conjecture of my own, and that is, That possibly, at the first Creation, the whole Earth was not all at once uncovered, but only those Parts whereabout Adam and the other Animals were created, and the rest gradually afterwards, perchance not in many Years; during which time these Shell-Fish might breed abundantly all the Sea over, the Bottom whereof being elevated and made dry Land, the Beds of Shell-Fish must necessarily be raised together with it.

This Conjecture hath no fufficient Ground to support it, and therefore 1 do not insist upon it. But, truly, if it had, I see not any better Account could be given of all the Phanomena of them, than from thence might.

2. It will hence follow, that many Species of Animals have been lost out of the World, which Philosophers and Divines are unwilling to admit, esteeming the Destruction of any one Species a Dismembring of the Universe, and rendring the World imperfect; whereas they think the Divine Providence is especially concerned, and solicitous to secure and preserve the Works of the

the Creation. And truly so it is, as appears, in that it was so careful to lodge all Land Animals in the Ark at the Time of the general Deluge; and in that, of all Animals recorded in Natural Histories, we cannot say that there hath been any one Species lost, no not of the most infirm, and most exposed to Injury and Ravine. Moreover, it is likely, that as there neither is nor can be any new Species of Animals produced, all proceeding from Seeds at first created; so Providence, without which one individual Sparrow falls not to the Ground, doth in that manner watch over all that are created, that an entire Species shall not be lost or destroyed by any Accident. Now, I say, if these Bodies were sometimes the Shells and Bones of Fish, it will thence follow, that many Species have been lost out of the World: As for Example, those Ophiomorphous ones, whose Shells are now called Cornua Ammonis, of which there are many Species, none whereof, at this Day, appear in our or other Seas, fo far as I have hitherto feen, heard or read. To which I have nothing to reply, but that there may be some of them remaining some where or other in the Seas, though as yet they have not come to my Knowledge. For though they may have perished, or by some Accident been destroyed out of our Seas, yet the Race of them may be preserved and contiqued still in others. So though Wolves and

and Bevers, which we are well affured were fometimes native of England, have been here utterly destroyed and extirpated out of this Island, yet there remain Plenty of them still in other Countries.

By what hath been faid concerning the Nature and Original of Stones, I hope it may appear, that this is no idle and unneceffary Discourse, but very momentous and important: And this Subject, as mean as it seems, worthy the most serious Consideration of Christian Philosophers and Divines; concerning which, though I have spent many Thoughts, yet can I not fully satisfy myself, much less then am I likely to satisfy others.

But I promise myself and them more full Satisfaction shortly, from the Labours of those who are more conversant and better acquainted with these Bodies than I, who have been more industrious in searching them out, and happy in discovering them; who have been more curious and diligent in considering and comparing them, more critical and exact in observing and noting their Nature, Texture, Figure, Parts, Places, Differences, and other Accidents, than myself, and particularly that learned and ingenious Person before remembred.

According to my Hope and Expectation, fince the Publishing of this Work, my learned and ingenious Friend, Mr. Edward Lhwyd, bath

hath gratified the curious and inquisitive Naturalists, with the Edition of his excellent Lithophilacium Britannicum, or Classical Distribution of Stones and other British Fossils, remarkable for their singular Figure, as many as either himself hath hitherto found out, or received from Friends. To which he hath subjoined several Epistles relating to this Subject; the last of which, concerning the Original and Production of these Bodies, he hath done me the Honour to inscribe to me; which at my Request he hath translated into English, and enlarged with many Additions, which I shall here give the Reader.

## THE SIXTH LETTER.

Of the Origine of Marine Fossils, Shells, and Mineral Leaves, &c.

## To Mr. RAY.

Honoured Sir,

Y O U are pleased to ask, whether, after some Years Observations, I have been at length able to satisfy myself, as to the Origine of what we call Marine Fossils, and those other Bodies no less surprizing, which (to distinguish them from other Plants) I have taken the Liberty to call Mineral Leaves, viz. Whether I conclude,

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with the general Opinion, that they have been reposited in the Places we find them. at the universal Deluge, and so preserv'd to our Time; or that they are original Productions of Nature, there form'd from some Plastick Power of Salts, or other Minerals, which was the Conjecture of the late \*Pl. Na. C Dr. Plot\*, and other experienc'd Natura-Hist. ox. c lists. To this I must needs answer, That the frequent Observations I have made on ' fuch Bodies, have hitherto afforded little better Satisfaction, than repeated Occasions of Wonder and Amazement; for as much as I have often (I may almost fay continu-'ally) experienc'd, that what one Day's Observations suggested, was the next cal-' led in Question, if not totally contradicted and overthrown. Nevertheless, so indefatigable is the Curiofity, and indeed fo fuccessful have been the Discoveries of this ' present Age, that we are daily encouraged ' to hope, this so important a Question will not much longer want its final Determi-' nation, to the great Advancement of that 'Kind of real Knowledge which relates to Minerals: A Part of Natural History which, ' you well know, hath been hitherto much more neglected, than that of Plants and Animals; only, as I prefume, because these Bodies are less obvious to our View, and much more abstruse and unaccountable f as to their Origine. I therefore, at spare Hours,

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Hours, continue to improve my Collection? in regard it may be hoped, that from an accurate Inspection of it, some others hereafter may frame several useful Inductions. which I myself never had the least Thoughts of. And in the mean time, because the Communicating to our Friends, what carries but some Shadow of Probability, does often contribute somewhat towards the speedier Discovery of the Truth, I shall here submit to your Examination, a Conjecture relating to the Origine of these Bodies, which I know not whether any other have as yet thought of: But in regard it is necessary, that before any new Opinion be proposed, Reasons be offer'd against those already received, give me leave here to lay before you some Objections against both the above-mentioned Accounts of the Origine of these Bodies. To begin, therefore, with that which referrs all these Marine Fossils and Mineral Leaves, Stalks, and Branches, &c. to the Deluge, I have several Reasons to offer against it, whereof (because I would not presume too much on your Time and Patience) I shall at prefent only propose these few:

First, Therefore, as to the Marine Fosfils, had these Bodies been Spoils of the Sea, brought on the dry Land by an Inundation, they would (for the Generality of them at least) either have been left on the

Surface of the Earth, or have been lodg'd at no very great Depth under it; but I 'have found them buried (or inclos'd) with-in solid Marble on the Face of broken Sea Cliffs, of the Height of 200 Fathoms and more, from the Tops thereof to the Bottom, and observ'd them to be so continu'd under the Sea-Water; nor was that only upon the Face of these Rocks, but even, more or lefs, throughout the whole Mass of them. And this is manifest from divers Rocks hewn down by Workmen for making of Lime, and other Pieces cafually fallen from the Cliffs in the Isle of Caldey, and elsewhere about Tenby in Pembroke-' shire; as also in several other Rocks and Mountains that confift of fuch Bastard Marble, or Lime-stone, throughout Wales, Ire-' land, and other Countries. Now, altho' ' we should grant, that at the Time of the Deluge these Rocks were no other than Clay or Earth; and that, therefore, Sea-' Shells, Corals, and other Marine Bodies, ' might by the Violence of the Inundation ' have been lodg'd therein; and that in Tract of Time, this suppos'd Clay or Earth confolidated into Lime-stone: I say, though we should grant all this, yet I cannot per-ceive by what Force such Bodies could be ' funk into Clay or Earth to fo great a Depth. 'If indeed these Bodies constituted one continued Mass, so as that one should bear 'hard

' hard on the other, fomething perhaps ' might be reply'd; but the Matter is clear-' ly otherwise, for they are found so con-' fusedly dispers'd throughout the Mats of ' Lime-stone, sometimes at the Distance (for ' Example) of three Foot from each others; ' sometimes two, sometimes within half an ' Inch, and not seldom two or three or more

of them contiguous.

' Secondly, Such Marine Fossils have been observ'd on the Sides or Walls within our Lime-stone Caves, and are even sometimes found Ricking to the Roofs of them; for I have gather'd Cuthhert-Beads, or Entrochi have gather'd Cuthbert-Beads, or Entrochi, which are Vertebræ of Sea-Stars, from the Roof of a Cave call'd Lhygad Lhychwr, near Kerrig Kennen Castle, in the County near Kerrig Kennen Castle, in the County of Carmarthen; and on the Sides (as well as Bottom) of a noted Cave, call'd Porth-Gogo at Ystrad-Velbte in Brecknockshire, I ' have observ'd several Remains of Cockles, ' half worn by the Swift Current of the River Melhte which runs through this Cave, ' and polishes its Lime-stone. Now, al-' though I can readily grant, that the Deluge ' might have cast Marine Bodies into these and any other Caves, yet can I not allow ' that it could ever fasten them to their po-' lite Roofs and Sides; and that they should be funk so deep from the Top, is the Difficulty of the former Objection. To this may be added, that such Lime-stone Caves N 2 .

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for the most part (as it were) wainfooted with a stony Crust of Stalagmites, which is of no very old Date, but owing to the continu'd Dropping or Distillation of the Caves, in which if any Marine-like Bodies are found, as I can assure you the

\*V. Linb. Entrochi \* are, I leave it to yourfelf, and o-Br. p. ther unprejudiced Observers, to consider of

their Origine.

flioning whether all these Things be the streets of the Deluge, is, for that the Bones, Horns and Hoofs of Land-Animals, are very seldom, if at all, found inclos'd in solid Marble, or other Stone; whereas seeing all perished in the Deluge, the Spoils of the Land might be expected (in Propor-

tion) as well as those of the Sea.

Fourthly, 'Some Fossil-Shells are entirely compos'd of a Spar or Crystal, insomuch that there is no Distinction of a containing and contain'd Matter, but only a Crystal-line Body, of the Figure of a Shell, as is by Steno himself acknowledg'd; and as may be seen in mine, and other Cabinets of Form'd Stones. How so great a Change should happen to Sea-Shells, and yet their Shape or outward Form not violated, seems to me too difficult to explain. The like may be said of the Fossil Fish-Teeth, for these are not always of the same Matter,

as may be observ'd from divers Specimens

' in my Collection.

Fifthly, 'Living Animals are fometimes found in these Fossil-Shells; for in Mis-' son's Travels to Italy, we read of a Lobster found alive in the midst of a Marble near Tivoli\*; and the late Description of Orkney, &c. gives us the like Account of Cockles †. Moreover, as I am credibly ' informed, some Workmen very lately digging for the Foundation of a Building, near the Town of Mold in Flintshire, met with feveral Muscles at about three Foot Depth in the Gravel, which had living Fish in them. Now as it would be abfurd to ' imagine these Animals could live since the ' Flood, so neither can we suppose that such Creatures being left there by the Deluge, ' should propagate their Kind ever since; ' for in this case, there must have been left in that Place a Heap of their Shells.

' Sixthly, Had these Marine Bodies been e reposited in the Earth at the universal De-' luge, such of them as adhere to each others, ' nay all of the same Pits or Quarries, uns less their Beds be of a different Matter,

<sup>\*</sup> Misson's New Voyage to Italy, Vol. 2. p. 44. Engl. Edit. + A Gentleman in the Parish of Dunresness in Zetland, told one of the Ministers of this Country, that about five Years since, a Plough in this Parish did cast up fresh Cockles, though the Place where the Plough was going was three quarters of a Mile from the Sea, which Cockles the Gentleman saw made ready and eaten. Brand's Descript of Orkney, Zetland, &c. p. 115.

of Sten. Prod. p. must necessarily have undergone the same Change; whereas Steno acknowledges, that

he has found Testaceous Shells, adhering to one perfectly Crystalline +: And I have

to one perfectly Crystalline †: And I have myself often gather'd some Crystalline Specimens, and others Testaceous of the same

cimens, and others Testaceous of the same Sort of Shell, in the same Quarry, and in

the fame Stratum or Layer. 'Seventhly, The immense Quantity we have of Marine Fossils, seems no ways to ' plead for the Origine from the Deluge: For we may observe many thousands of great Stones, and even broken Pieces of Lime-stone Rocks throughout Wales, and the North of England, almost wholly com-' pos'd of those Vertebræ, or broken Pieces of the Radii of Sea-Stars, which are com-' monly call'd Fairy-Stones, and Cuthbert-' Beads, whereas 'tis very rare to find on our Shores, three broken Radii, or Fragments of any Sort of Sea-Stars close together. Likewise one shall rarely find in the fame Place, two fingle Teeth of any Fish on all our Coasts; whereas thousands of these Fossil Teeth, exactly answering those of divers Sorts of Sea-Fish, have been of ' late Years found in Quarries and Gravel-Pits about Oxford; nor is their Quantity at sall diminished upon breaking new Ground. Eighthly, Some of these Marine Fossils are no other than as it were Shadows or superficial Representations of Sea Bodies:

Nor do they feem to have much more of the Matter or Consistence of those Bodies they mostly resemble, than a Picture hath of the Person or Thing it represents. And of this Kind is Dr. Lister's Pettinites Membranaceus out of Cole-pits; \* The Mock- \* Append. plaice, or Buglossa curta strigosa of Caer- ad Trast. marthenshire, and + the Islebian Fish-Stones Angl. & 'in Germany, of which Olaus Wormius gives Conch. A-nat. Part. us this following Account. In the Islebian Alt. Slat (faith he) are seen sometimes a small + Linb. • Dust of the Golden Pyrites, which represents Brit. p. • various Figures of Animals. I have a large 96. Tab. • Piece of this Stone, which so lively expresses 22. N. 2. • all the Lineaments of a Barbel in golden Colour, that the Scales, the Fins, the Tail, the Head, &c. could not possibly, by any Artist, be ever better painted. The Bodies of these Fish are not converted into Pyrites; so that we have but just the outward Lineaments of them, and not the least Impression e left of any Bones, or other Parts. We find ourselves therefore oblig'd to confess, that · Nature reserves many things from our Know-' ledge, the true Reasons whereof no Man will ever so far discover, as to be enabled to render us a due Account of them. Now as these Representations are neither Animals them-' selves, nor the Exuviæ of Animals, so neither can they be their Impressions, foralmuch as these Lineaments are prominent, not impress'd: And as for the Impression

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they make on one Side in the incumbent Stone, or other Matter, it seems not satisffactory, because I cannot well conceive how all the Vertebræ of a Fish, whereof many are frequently found in our Midland Quarries and Gravel-pits, should here be ' totally confum'd, and the Surface only of one Side be converted into this Pyrites, or

Marchasite. 'Ninthly, Another Obstacle of my Assent to their being all of Diluvian Origine, is the vast Number of unknown Marine Fosfils, fo commonly met with throughout most Counties of England; such as we have nothing like, neither in our Sea Shores, nor rak'd by Dredges out of the Bottom of the Sea, by the Oyster Fishermen, and others who have been employed by curious Persons on set Purpose. I have in my Collection above forty different Species of the Fossil Nautili, or those Shell-Stones, a great many Sorts whereof are commonly \*W. Link. call'd Cornua Ammonis \*; and have observ'd B7. p. 15. 6 Plenty of most of these Species (broken or whole) in the Fields, Quarries, and Clay-' Pits of the Midland Counties of England: Nor do I question, but in that excellent Collection of Dr. Woodward's, and in those of some others of our curious Naturalists, feveral Species may be found that are not in mine: And yet I cannot understand that all our British Seas afford one Sort of

### the Deluge.

this Shell. The like may be faid as to fe-veral other Kinds; particularly the Sea-Stars, of the broken Radii whereof we find no less a Variety: \* And the Echini, as \* 1b. Clas to the Prickles or Radioli of which, as 6. p. 44. well as to those of Sea-Stars, all Sorts of Lapides Judaici (as many Years since I ' hinted to you) must be referr'd; notwithflanding the excessive Thickness of some of them, and that they have that very rough or Graser-like Superficiest, so as to be no-tvide Plot's thing like the Spines of any of the Echini, Hist. Nat. or Star-Fish of our Seas. Tenthly, I add only one other Argument, Tab. 12. which though many have already objected, N. 1002, e yet hath not, that I know of, been hitherto 1008,866 answer'd to Satisfaction: And that is, that fuch Marine Substances are sometimes gee nerated in Humane Bodies: For to me it e appears a far less Wonder, that Shells and other Marine Bodies should be produc'd in the Bowels of the Earth, than their Production in the Bodies of Men or Animals at Land. And that they have been for found, is sufficiently attested, both by Ancient and Modern Authors, of a Credit and Character beyond all Exception. You know many Instances of this Kind are pro-' duced by Dr. Lister, in the Second Part of his Anatomy of Shells; amongst which I remember very well to have seen that small E Turben, or Periwinkle, discovered by

Dr. Pierce of Bath, and sent to Dr. Muse grave, then Secretary to the Oxford Philofophical Society; and it was such, as I be-lieve none could have possibly distinguish'd from a Sea-Shell. These, Sir, are the Ob-jections I had to offer against their Opinion, who attribute the Origine of all these Ma-rine Fossils to the universal Deluge: For whatever their true Origine is, Marine Foffils they ought to be term'd, in order to their better Distinction from all others, 'Tis also for the like Conveniency of Diflinction, that I use the Term of Mineral e Plants for those Fossil Leaves and Branches we find fo commonly inclos'd in Stone and ' blue Marble at our Cole-pits, and some Iron Mines. And now to proceed to these, we shall find much the like Difficulties with what occurr'd when we consider'd the Mas rine Fossils.

First, For in the first place, these subterraneous Leaves frequently (indeed most commonly) are sound at the Depth of at

fleast twenty or thirty Foot. And how they flould be laid so deep by an Inundation, feems to me not so easily accountable; it

being natural to suppose, that all Plants were left, by the Deluge, on the Surface of

the Earth, in the manner we daily find several America Seeds of Leguminous Trees

cast up on the Shores of Ireland, Scotland, and Wales; and that consequently, in a

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fhort Space, there would be no more Remains of them, than we find of those Sea Plants we commonly dung our Land with-

call.

Gecondly, Allowing they might be, by fome Accident we cannot think of, buried fo deep, I can discover no Reason for their being thus lodg'd so plentifully in Cole-Slat, and Iron-Stone; and never, that I know of, in the Mass of our Flint, Limestone, and common Rock, though there be infinitely the greater Quantity of these latter. And this Note seems to deserve our Consideration, unless it can be made out, that though the Matter of Flint and Limestone has very entirely preserv'd the Antediluvian Shells, yet it could not Leaves, or other Parts of Vegetables.

'Thirdly, Had they been owing to the Deluge, we should find the Leaves and Branches of such Plants as are Natives of our own Island, much more plentifully than such unknown Plants as we cannot parallel: Whereas on the contrary, as far as Dr. Richardson's Observations, and my own, have been able to distinguish, the Generality of these Mineral Leaves, are clearly distinct from those of our British Plants.

'Fourthly, Had they been thus reposited at the Deluge, some Specimens of most, if not of each Class of Plants, would be found amongst

amongst them; and especially of Trees; in regard such Leaves are not only the most numerous, but also commonly the dryest and most durable. But we have not hitherto discover'd, that any of these Mineral Leaves answer to those of Trees or Shrubs; nor are we assured that any have been yet found, but what may be reduced to three or four Classes.

'Fifthly, The same curious and ingenious Gentleman hath observed, that these Mineral Leaves are, generally speaking, less than these than seem made to resemble

than those they seem most to resemble; which is what, in divers Specimens, I have

fince taken Notice of myself.

Sixthly, Although sometimes meer flexible Leaves are found amongst these Mineral Plants, yet the Generality of them (as I have before observed of some of the Marine Fossils) are but meer Delineations, or superficial Resemblances: Nor yet could such Representations be owing to the Impressions of Plants, since consum'd; because, as I have said before of the Mock-Fish, they are a little raised above the Surface of the Stone, and not impress'd.

face of the Stone, and not impress'd.

Seventhly, It seems nothing more strange
or unaccountable, that Delineations of
Leaves should be naturally produced in
this Coal-Slat, &c. than that Representations of Gnats should be sometimes found

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in the Fossil Amber of Prussia\*, and of Spi- \* Harrens.
ders in the Coal-Slat in England †. But Hist. Succini, Prussis if any assert, that these were once living p. 85.
Animals, they are to explain how they came † Link.
fo deep under Ground; and afterwards, Brit. p.
how they got into these entirely close Prifons of Stone and Amber. I meet with 'several more Difficulties, but perhaps of

'less Moment, which I shall not therefore

trouble you withall, till some other Occafion.

'As to the other Opinion, which maintains, that all these Bodies are form'd in the Earth; the greatest Difficulty it labours under, is, that we find ourselves incapable of ' giving any satisfactory Account of the Cau-' ses and Manner of such a Production. For ' if any have Recourse, with Dr. Plot, to the 'Plastick Power of Salts, I see not (to go no farther) what they can answer to that Ob-'jection propos'd by yourfelf long fince, in your Physico-Theological Discourses. For who can reasonably imagine, that any Mieneral Salts should so conspire, as that some of them should so exactly frame the Points of the Glossopetra\*, which are Fish-Teeth, \*\* Lith. of one Matter, and some their Roots (ad-Brit. Teb 12). ding now and then a Piece of a Jaw) which Tab. 13. A. 1270. are of another: That some should form

the polite Convex Side of a Siliquastrum, and others its Appendix +1: That some ++ 1bid. should make the Sceket or Calin of the Tab. 16.

Be- N. 1505.

## Consequences of

\* Ibid Tab. 21. & Scheuch. Lith. Hel- c vet. Tab. I . Fig. ii.

Belemnites, and others its \* Alveolus, &c. 'I therefore humbly offer to your Confide-N. 1675, c ration, some Conjectures I have of late Years entertain'd concerning the Causes, Origine, and Use of these surprizing Phanomena. I have, in short, imagin'd they might be part-'ly owing to Fish-Spawn received into the Chinks and other Meatus's of the Earth in 'the Water of the Deluge, and so be deriv'd '(as the Water could make way) amongst the Shelves or Layers of Stone, Earth, Gc. and have farther thought it worth our Enquiry, whether the Exhalations which are raifed out of the Sea, and falling down in Rains, Fogs, Gc. do water the Earth to the Depth here required, may not from the Seminium, or Spawn of Marine Animals, be 'fo far impregnated with, as to the naked 'Eye invisible, animalcula, (and also with 'separate or distinct Parts of them) as to ' produce these Marine Bodies, which have 6 fo much excited our Admiration, and in-' deed baffled our Reasoning, throughout the 'Globe of the Earth †. I imagin'd farther, that the like Origine might be ascribed to

In those accurate Microscopical Observations communicated to the Royal Society by Sir C. H. we find this Note: ---Some of them also may probably be originally Water Insects, or Fish, sui generis, and are small enough to be rais'd in Substance or in Spawn with the Vapours, and again to fall with the Rain, and may grow and breed again in Water when kept: And this will feem

the Mineral Leaves and Branches, feeing we find that they are for the most part the Leaves of Ferns, and other Capillaries; and of Mosses and such like Plants, as are called less perfect; whose Seeds may be easily allow'd to be wash'd down by the Rain into the Depth here required, seeing they are so minute, as not at all to be distinguish'd by the naked Eye. And as to such of them as are not reducible to these Classes of Minute Seeds, they are such as I know not at all whither to referr.

I AM not so fond of this Hypothesis, as not to be sensible myself, that it lies open to a great many Objections; and, in all probability, you will soon discover more Difficulties than I shall be able to remove: However, those Arguments that first led me to it shall be here laid before you.

However, those Arguments that first led me to it, shall be here laid before you.

'First, Because I observed, that of all these extraneous Figures or Representations dug out of the Earth, there is scarce one in a thousand but is reducible to such natural Bodies as expose their Seeds either to the open Air or the Water: Name
'y, Plants, Insects, or Fish. For (as I have

lefs strange to you, when I assure you that I have seen, and when I am so happy as to wait on you next, will shew Fishes, some as small as Cheese-Mites of different Sorts, very wonderfully made, which are of the crustaceous Kind, shell'd with many Foints, with very long Horns, fringed Tails, and have many Legs like Shrimps, &c. Phil. Tran. for March and April, 1703. P. 1366.

# Consequences of

I 92

before hinted) had the Spoils of the De-' luge been entirely (or, for the most part) preserv'd to our Time, we might reasonably expect Plenty of the Skeletons, and of the Horns and Hoofs of Quadrupeds! And, why should not either entire or broken Skeletons of Birds, be found preserv'd Ilikewife in the same manner and in the fame places we find the Leaves of Plants? . How happens it, at least, that we find none at all of their Pen-feathers, which should feem of a Constitution more durable, if once inclos'd in fine Stone, than that of Plants? I am not ignorant, that some very learned Writers, and those even eminent Naturalists, have inform'd us, that not only Bones of Land-Animals, have been frequently found inclos'd on all Sides in solid Stone, but likewise the Representations or Lineaments of Birds and Beasts, and of Men and their Parts: Nay, even that Monks, Hermits, and Saints, have been exactly pourtray'd in the midst of solid Marble. To these I must take leave to reply; First, That some of these Informations are manifestly erroneous; for that they tell us, that these Delineations ape pear'd upon polishing the Marbles; whereas all Figures naturally delineated within Stones, must, upon polishing these Stones, be defac'd. Secondly, When we discover any unknown Fossils, we are very subject

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to make wrong Comparisons; assimila-' ting many of them to the Parts of Land-Animals, which, indeed, ought to be reduc'd to Sea-Shells, or other Marine Bodies; as may be observ'd in those Stones. call'd Hippocepaloides, Otites, Bucardites, and divers others. Thirdly, Although it be granted, that sometimes the Bones, Horns, and Hoofs of viviparous Animals, are dug out of the Earth; yet, feeing they are so very few, it seems much like-lier that they might have been bury'd by fome other Accidents, than that they have been there preserv'd ever since the Deluge. For in the Deluge, all Land-Creatures whatever perish'd; nor should we so much expect to find their fingle Bones as whole Skeletons, thus interr'd. Fourthly, Whenever I find any Confirmation, by competent and credible Authors, of fuch Delineations of any fort of viviparous Animals, or Birds, as the Islebian Stones exhibit of Fish, I shall then readily grant, these Things may be also as well produc'd without previous Seeds; and offer no farther Arguments for this Hypothesis.

Secondly, 'I am, as to my own part, abundantly fatisfy'd; and others will, I prefume, upon Sight, and accurate Observation of some Fossils I have collected, be no less, that these Bodies do, in Tract of Time, quite lose their Forms, and become

fuch shapeless Lumps, as to be distinguish'd for Marine, by none but such as are very conversant in Observations of this Kind, nor even, at last, by them neither. I say, I am fully satisfy'd thereof; because I have collected sparry or crystalline Bodies, whose Surface do only partly refemble Entrochi; likewise Shells, Glossoe petræ and Siliquastra, consisting of a slinty fort of Pebble, and receding from their proe per or common Figures. And, Lastly, 'İchthyospondylli, or Fish-Vertebræ; some-'times more, fometimes less, deform'd; exhibiting on their Surface, fuch small stelc lated Figures as we find on a fort of the \*v.Plot's \* Astroites. Now seeing that, in Tract of 'Time, some of them lose their Substance and Form, degenerating into other Bodies, may we not suspect that others (considering the Intireness of many of them, and their vast Plenty) might be, in the interim, produc'd? Thirdly, 'If this Hypothesis may be ad-' mitted, fome Account might probably be given of the Fossil Nautili, and other strange Shells, by supposing, First, That many of those Clouds, which fall here in Rains, Gc. have been exhal'd in very remote Parts: And, Secondly, That such a Generation, as is here suppos'd, must be much more liable to monstrous Produ-Etions than the common. For, as Agri-

Hift. Oxon. p. 87. 6 Lith.Brit. Tab. 20.

Num.

1658.

cola fays, appositely to this Purpose, Quanto crassior est terra quam aqua, tanto imperfectiores gignit formas, & que animalibus careant.

Fourthly, 'I have often, in one and the fame Quarry, gather'd 20 or 30 different Magnitudes of the fame Species of Shell-Stones; whence I began to suspect, that

they might have a certain vegetative Growth +; and that they had, therefore, + see the their Generation and Corruption in the ve- Works of ry Place we find them: And that hence it the Learned is, that we find some Nautili, Lapides for the Judaici, Glossopetra, and Astropodia, of Month of fuch monstrous Largeness, that no Seas, as 1703. far as our curious Naturalists have disco-'ver'd, afford any thing comparable to

them.

Fifthly, 'To comprize the rest in few Words: The burying of these Leaves of Plants so deep; the vast Quantity of these Marine Bodies; the incredible Va-' riety of exotick or unknown Shells, Sea-Stars, &c. in so narrow a Compass as this 'Island; their so frequently distorted and uneven Surfaces; that they should be found at all Depths, from the Top of the highest Rocks to the Bottom; that they should be onot rarely found adhering to the Roofs, and to the Walls, or Sides of Caves, as well as perpendicular Clefts of Rocks; s and be also sometimes discover'd in Ani-

### Consequences of

mal Bodies at Land; and that there should be Sea-Shells dug at Land containing living

'Animals. I say, all these considered toge-

'ther, feem inconsistent with the Essects of a Deluge; and if this Hypothesis may be

admitted, not very difficult.

But before it be, I ought not to doubt, but that yourfelf and others will find many

of more Objections than I can forefee. In the

mean time, such as occurr to my Thoughts, I shall here, however destructive they may

o prove to it, fairly lay down; for they who have no other Aim than the Search of

Truth, are no ways concern'd for the Ho-

nour of their Opinions: And for my part, I have been always, being led thereunto

by your Example, so much the less Admi-

rer of Hypotheses, as I have been a Lover of

Natural History.

THE main Difficulties that I can at pre-

fent think of, are these:

First, 'It will be question'd, whether the suppos'd Seminium can penetrate the Pores of Stones.

Secondly, 'It will scarce seem credible, 'that such Bodies, having no Life, should grow, especially when confined in so seemingly unnatural a Place as the Earth, &c.

Thirdly, 'According to this Hypothesis,' these Bodies should be found in much the fame manner, lodg'd in all kind of Stone,

6 Gc. and throughout all Countries.

Fourth-

Fourthly, 'We should not find Plenty of Shells, &c. adhering to each others, in the fame manner as they are found at Sea.

Fifthly, 'Some Fossil Shells should then be found so minute, as to be scarce visible, and others of the same Kind in their complete

Magnitude.

Sixthly, It may be well question'd, whether the essential Parts of this suppos'd
Spawn of any Fish, should, being separated, (as must be here often suppos'd) ever
essentially when brought out of their proper
Element.

Seventhly, 'It will be faid, that the re'maining Tracks of Shells that once adhe'red on the Surface of some of these Fossils,
'and the Pearls, which (as has been related)
'have been found sticking to others, are a
'plain Proof that they are the Spoils of once
'living Animals; also the Change of the
'Colour near the Roots of some Fossil Fish
'Teeth, as namely of some Pleetronitæ, shew
'how far they were fasten'd in the Jaws of
'once living Fish; and that the worn Extremities of some others, do plainly discover
'that they have been once employ'd.

Eighthly, 'Many of these subterraneous 'Fish, as particularly several of the Glosso-'petra, are taken for the Teeth of Viviparous 'Fish; which being granted, it is impossible

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they should be produced in the Manner

here proposed.

Ninthly, and Lastly, 'Such a Production' seems clearly beside the ordinary Course of Nature; nor can we perceive any End or Use of so preternatural a Generation.

'To the First I answer, That it's manifest from Experience, upon which all solid Philosophy must be grounded, that the Spawn of Animals may infinuate itself in-

to the Mass of Stone.

AND this plainly appears from Live Toads, found fometimes in the midst of Stones at Land, and those Shell-Fish called Pholades at Sea. If it be replied, That the Stones, wherein the Pholades are lodg'd, are full of large Holes, &c. I answer, That tho' they generally are so, yet, upon breaking and examining a great many of these Stones, I have sometimes sound of their Shells (though without Animals) so lodg'd, as that there were not any visible Meatus's from their Holes, neither directly to the Surface of the Stones, nor to those other Holes in them.

To the Second, That that's not fo great a Wonder, as that Shells should be some-

times

<sup>\*</sup> Missum est ad me alio ex lisore Saxum, in quo nullæ rimæ, nullæ cavernæ, sed foramina tantum apparebant tam exigua, ut vix aciem admitterent: Eo igitur islibus multis confrasto, cavitates internæ multæ erant, vario situ & diversæ magnitudinis in quibus conchas istas reperi. Rondel. de Aquatilib.

times generated, and even grow, tho' they contain no Animals within humane Bodies; and within the Mass of those thick Shells of our large Tenby Oysters, which I formerly mentioned to you, as first shewn me by Mr. William Cole of Bristol, and have since observ'd myself. For we must grant, that the Earth, even in any Part of the Insland Country, is much fitter for their Reception and Augmentation than humane Bodies; especially, if we reseat, that when the Spat or Seminium here supposed, meets with saline Moisture in the Earth, living Animals are sometimes produc'd, as is before attested.

THE Third is likewise answer'd from Experience: For we know, that Sea-Shells, and some Stones, yield to the Growth of Plants: Also, that the hardest Stones are impress'd by the Limpets, tho' they do but adhere to their Surface, and that our Limestone yields to the Growth of some Echini, or Sea-Urchins, as well as the Pholades: For, we find some of their Cells much less than others; and that 'tis certain, that all the Holes wherein they lurk, in what Stones soever they are found, are owing to their Growth.

To the Fourth I answer, That this Hypothesis does not require, that these Marine
Bodies should be produc'd in all Countries alike. For, as in Vegetables, we find,

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that

that all Seeds will not be receiv'd by all Soils;
fo neither can we expect, that all Earths and
Minerals should be equally proper for such
Productions. And, truly, I thought it well
worth Observation, that, as in all these
Countries, scarce any Stones at Land, excepting the Lime-stone, afford Marine Fossils; so I never sound the Pholades at Sea
in any other, tho' in that very common;
and in divers Counties of Wales.

As to the Fifth, I pretend not to determine, how long such Bodies may continue before their Dissolution; but doubt not, but that, according to the Nature of the Minerals wherein they are bedded, they may last much longer in some Places than others; and, therefore, we are not to wonder, if in such Places we find a far greater

Plenty of them than elsewhere.

'To the Sixth, I answer, That at the Ba'fy's Leigh Quarry, near Oxford, large Spe'cimens of the Turbinites Major, figured
'Table the 7th, Numb. 341. may be often
'met with; and, likewise, in the same Place,
'concreted Lumps of others of the same
'Species, very minute. I have also, in my
'Collection, divers other Examples of the
'same Kind: And Steno informs us, That
'he has discover'd amongst Fossis, some so
'small, as to be scarce discernible without a
'Microscope, and even minute Eggs of
'Shells.

THE Seventh may be, in a great measure, answer'd from the numerous Histories we have of monstrous Productions: And, 'as to the Impropriety of the Place, the 'fame may be answer'd here, in reference 'to Parts of Animals, as was to the Second 'Objection, in respect of Whole ones.

EIGHTH, As to the Adhesion of one Shell 'to another, that may altogether as well happen by this Way of Generation as at Sea: And, for the Signs or Impressions 'made by some, that formerly adher'd to them, those might have been disjoin'd by 'the Workmen in digging, or by the Sink-'ing of the Ground where they are found, or some other Accident. But, as to the 'Change of the Colour of the PleEtronites ' towards the Root, and some of them being 's sharpen'd at the Point, I must confess I 'have little to fay; but that we do not yet know, the Teeth of what Fish these Ple-' Etronit a are; and, consequently, cannot tell, but they may be naturally fo colour'd, and pointed: Or elfe, that these and many more have been thus preserv'd in the Place we find them, ever fince the Deluge, which was formerly my Opinion of all these Marine \* Fossils; though, for the Reason I have \* Phil.

Frine\* Fossils; though, for the Reason 2.

here given, I cannot now maintain it.

NINTH, To the Ninth may be answer'd, for the Month
That we have as yet but an imperfect of May,
Knowledge of the Generation of particular

Species

112.

Species of Fish. For whereas you have observ'd, that some of the Cartilagineous are viviparous, I have noted others to be oviparous; having observ'd Embryo's in the Eggs of a fort of Dog-Fish, (which were open at the one End) cast ashore in

Anglesey, Carnarvonshire, and other Counf tries. 'TENTH, As to the last, tho' we acknowe ledge that there is an End in all the Productions of Nature; yet it is no less certain, that we are often but very improper ' Judges of fuch Final Causes. Who, therefore, can be assur'd, but that the Fertility of the Earth may, in a great measure, be owing to these Marine Fossils? Thus much, at least, I have observ'd, that in Wales they at least, I have observed, that in Wales they are found, for the most part, in the best Countries, and that in vast Quantities:
And on the other hand, in those Hundreds which are most barren, as the mountainous Parts of Cardigan, Montgomery, Meirionydh, and Caernarvon, I could never find one of them. There is, at Cleydon-Field, near Banbury in Oxfordshire, a Place call'd Hore-Furlong, which is noted for Plenty of the Asterie or (as there call'd) Plenty of the Asteria, or (as there call'd)
Hore-stones; and no less, as the Farmers

\* Plot's Hift. ' assur'd me, for its Fertility. Moreover, Oxon. we cannot be fo positive, but that some p. 85. & Lith. Minerals may from hence derive their Brit. P. 57,

Origine, to say nothing of their Physical

Gufe; the Lapis Judaicus and Lyncurius having been long fince well known in our Shops, as perhaps some others are elsewhere, and more may be hereafter. And these, Sir, are the Notions I had to offer to your Consideration, concerning the Origine of Marine Fossils and Mineral Leaves. You will soon judge how frivolous they may be, or how probable: And as you find them, pass your free Censure; for 'tis the Truth of so important a Question that's the only Aim of,

Raiadar Gŵy, Mar. 10. 1698. S I R, Your Humble Servant, E. L.

For my part, (if my Opinion be considerable) I think that my learned Friend hath sufficiently proved, that these Fossil-Shells were not brought in by the universal Deluge. He hath made it also highly probable, that they might be originally formed in the Places where they are now found by a spermatick Principle, in like Manner as he supposes. Why do I say probable? It is necessary that at least those which are found in the Viscera and Glands of Animals, be thus formed; and if these, why not those found in the Earth? I shall say no more, but that those who are not satisfied with his Proofs, I wish they would but answer them. One thing, I confess, there is, which chiefly brought me

over to the contrary Opinion, viz. That these Bodies owe their Original to the Sea, and were sometimes the Shells or Bones of Fishes: That is, the Beds of Oyster-Shells found in feveral Parts of this Kingdom, some of which I have before-mention'd and describ'd; which Shells, all Circumstances considered, one can hardly be induced to believe to have been any other originally than the Covers of living Oysters, and the Places where they lie, than the Bottom of the Sea. But because this feems to inferr the like Original of those Beds of Cornua Ammonis, or Nautili, found at Keinsham in Somersetshire, and elsewhere, of which Sort of Shell-Fish (as I have before noted) there were never any found in our own Seas, nor indeed in any other, fo far as I have heard of, I shall allow them to have been the Effects of the like Principle with their Fellows.

The following Tables, containing some Species of the most different Genera of these Bodies, viz. Shark's Teeth, Wolf-Fish's Teeth, Cockles or Concha, Periwinkles or Turbens, Cornua Ammonis or Serpent-Stones, Sea-Urchins and their Prickles, Vertebres and other Bones of Fishes, entire Fishes petrify'd, and of those some singly, some represented as they lie in Beds and Quarries under Ground, for the Information of those who are less acquainted with such Bodies, were thought sit to be added to this Edition.

TAB.













#### TAB. II. Pag. 204.

FIG. 1, 2. Several Fragments and Lumps of petrify'd Shells. as they lie in Quarries and Beds under Ground; on many of these Petrifactions there still remain some Lamine, or Plates of the Original Shells, which prove them not to be Stones primarily to figured.

Fig. 3. The Cornua Animonis lying in Rocks with other

petrify'd Bodies.

#### TAB. III. Pag. 204.

FIG. 1, 2. Two petrify'd Fishes lying in Stone, with their

Scales and Bones.

Fig. 3. A Sea-Urchin petrify'd with its Prickles broken off, which are a Sort of Lapis fudaicus, or few-Stones; their Infertions on the Studs or Protuberances of the Shell are here shewn. See their History and Manner of Lying in Stone and Beds, in Agostino Scilla, 4to. Napoli.

### TAB. IV. Pag. 204.

FIG. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14. Several petrify'd Teeth of Dog-Fishes, Sharks, and other Fishes.

Fig. 15, 16. The same lying in a Tophaceous Bed, and al-

fo in a law-Bone.

Fig, 17. The petrify'd Teeth of a Wolf-Fish, in a Piece of the Jaw; the round ones, or Grinders, are sold in Maltha for petrify'd Eyes of Serpents; and by our Jewellers and Goldsmiths for Toad-stones, commonly put in Rings.

Fig. 18, 19, 20. Other petrify'd Bones of Filhes, especially Joints, or Vertebra's of Back-Bones, one with two stony Spines issuing out, f. 20. See them more at large in the Draughts of that curious Sicilian Painter, Agostino Scilla.



#### CHAP. V.

That there have been great Changes made in the Superficial Part of the Earth since the General Deluge, and by what Means.



SHALL now discourse a little concerning such Changes as have been made in the Superficial Part of the Earth since the universal Deluge, and of their Causes.

THAT there have been such, I think no sober and intelligent Person can deny, there being fo good Authority and Reason to prove it. Plato, in his Timaus, tells us, That the Egyptian Priests related to Solon the Athenian Law-giver, who lived about 600 Years before our Saviour, that there was of old Time, without the Streights of Gibraltar, a vast Island, bigger than Africa and Asia together, called Atlantis, which was afterward by a violent Earthquake and mighty Flood, and Inundation of Water, in one Day and Night wholly overwhelmed and drown'd in the Sea. Whence it may be conjectured, that the Old and New World were at first continuous, or by the Intervention of that Island, not very far remote from each other.

THAT the Island of Sicily was of old broken off from Italy by the Irruption or Insinu-

ation of the Sea, is generally believed, and there is some Memorial thereof retained in the very Name of the City Rhegium, standing upon the Fretum that separates Italy and Sicily, which signifies breaking off.

Dicitur Italia, donec confinia pontus

Abstulit, & media tellurem reppulit unda.

Metam.
lib. 15.

In like manner, the Island call'd Eubæa, now Negroponte, was of old joined to Greece, and broken off by the Working of the Sea.

MOREOVER, the Inhabitants of Ceylon report, that their Island was anciently joined to the Main-Land of India, and separated from

it by the Force of the Sea.

It is also thought, and there is good Ground for it, that the Island of Sumatra was anciently continuous with Malacca, and called the Golden Chersonese; for being beheld from afar, it seems to be united to Malacca.

AND to come nearer Home, Verstegan affirms, and not without good Reason, that our Island of Great Britain, was anciently Continent to Gaule, and so no Island but a Peninsula, and to have been broken off from the Continent, but by what Means, it is in his Judgment altogether uncertain: Whether by some great Earthquake, whereby the Sea first breaking through, might afterward by little and little enlarge her Passage; or whether

ther

ther it were cut by the Labour of Man in regard of Commodity by that Passage; or whether the Inhabitants of one Side, or the other, by Occasion of War, did cut it, thereby to be sequestred and freed from their Enemies.

His Arguments to prove that it was formerly united to France, are, 1. The Cliffs on either Side the Sea, lying just opposite the one to the other; that is, those of Dover to those lying between Callais and Boulogne, (for from Dover to Callais is not the nearest Land) being both of one Substance, that is, of Chalk and Flint. 2. The Sides of both towards the Sea plainly appearing to have been broken off from some more of the same Stuff or Matter, that it hath sometime by Nature been fastned to. 3. The Length of the faid Cliffs along the Sea-Shore being on one Side answerable in effect to the Length of the very like on the other Side, that is, about fix Miles. And, 4. The Nearness of Land between England and France in that Place; the Distance between both, as some skilful Sailors report, not exceeding 24 English Miles. To which may be added, 5. The Shallowness of the Channel all along the Streight, in respect of the Sea at both Ends of it, which is much deeper. And, 6. The Being of Wolves and Foxes, yea, and Bears too, anciently in this Island; for it is not likely that they of themselves should venture to swim over a Channel 24 Miles broad; or if they were

were so hardy as to venture in, should be able to hold out till they had passed it quite over: Neither is it probable that Men should transport such noisome and mischievous Creatures by Shipping. To speak in general, the Being of these wild Beasts on many Islands near the Continent, and not upon those that are far remote from it, though of sufficient Bigness to receive and maintain them, as the Spaniards sound when they first sailed to America, is to me little less than a demonstrative Proof, that those Islands were anciently joined to the Continent by some Neck of Land which served as a Bridge for these Creatures to pass over, and was afterward worn through and washed away by the constant Working of the Sea.

Some of the Ancients, as Strato, quoted by Strabo in the First Book of his Geography, say, That the Fretum Gaditanum, or Streight of Gibraltar, was forcibly broken open by the Sea. The same they affirm of the Thracian Bosphorus and Hellespont, That the Rivers filling up the Euxine Sea, forced a Passage that way, where there was none before. And in Confirmation hereof, Diodorus Siculus, in his Fifth Book, gives us an ancient Story current among the Samothracians, viz. That before any other Floods recorded in Histories, there was a very great Deluge that overslowed a good Part of the Coast of Asia, and the lower P

Grounds of their Island, when the Euxine Sea first brake open the Thracian Bospho-rus and Hellespont, and drowned all the

adjacent Countries.

THIS Traditional Story I look upon as very considerable for its Antiquity and Probability, it feeming to contain something of Truth: For it's not unlikely that the Euxine Sea, being over-charged with Waters by extraordinary Floods, or driven with violent Storms of Wind, might make its Way through the Bosphorus and Hellespont. But it will be objected, that the Euxine Sea doth empty itself continually by the Bosphorus and Hellespont into the Mediterranean, and that if it had not this Way of Discharge (the Rivers bringing in more than is spent by Vapour) it would foon overflow all its Shores, and drown the circumjacent Countries; and fo it must have done soon after the Flood; and therefore it is not probable that Samothrace should have been inhabited before that Irruption, if any fuch there were.

To which I answer, 1. That Monsieur Marfilly thinks he hath demonstrated an Under-Current in the Thracian Bosphorus, by means of which the Euxine may receive as much Water from the Mediterranean as it pours forth into it. But because I have already declared myself not to be satisfied of the Being and Possibility of these Under-Currents, I answer, 2. The Annual Receipts

from

from the Rivers running into the Euxine, not very much exceeding what is spent in Vapour, who knows but that from the Time of the general Deluge, till the Irruption whereof we are discoursing, the Euxine might yearly enlarge its Bason, and encroach

upon the Neighbouring Countries?

NATURAL Historians give us an Account of new Islands raised up in the Sea: Plin. Hist. Nat. lib. 2. cap. 87. enumerates Delos and Rhodes, Mands of Note; and of less Account and later Emersion, Anaphe beyond Melos, and Nea between Lemnos and the Hellespont: Alone between Lebedos and Teos, and among the Cyclades, Thera and Therafia, Olymp. 135. An. 4. Among the fame, after 130 Years, Hiera, and two Furlongs distant, in his own Time, when Junius Syllanus, and L. Balbus were Consuls, Thia. Notwithstanding these Authorities of Seneca, Pliny, and Strabo, before-mentioned, Dr. Woodward, in his Natural History of the Earth, confidently affirms, That there is no authentick Instance of any considerable Tract of Land that was thrown up from the Bottom of the Sea by an Earthquake, or other subterraneous Explosion, so as to become an Island, and be render'd habitable. That Rhodus, Thera, 'Therafia, and several other Islands, which were supposed by the Ancients, and upon their Authority by later Authors, to have been thus raised, had really no such Ori'ginal, but have stood out above Water as 'long as their Fellow-Islands, and stand now just as the universal Deluge left them.

I CANNOT but wonder at the Confidence of this Author, in affirming this of all Islands, not excepting any, whenas Seneca, a grave and fober Writer, and of undoubted Fidelity, tells us, Natural. Quaft. lib. 6. cap. 21. Theram & Therasiam, & hanc nostra atatis insulam spectantibus nobis in Ægæo mari enatam: And this Island of our own Age, which was raised up in the Agean Sea, ourselves beholding it. But the most considerable and remarkable Mutations that have been made in the Earth have been on the Sea-Coasts, either by carrying on the Land into the Sea, and atterrating the Bottom of the Sea; or by drowning the Lands near the Sea, by Irruptions and Inundations thereof, or undermining or washing away the Shores.

OF the first Sort of Change by Atterration, or making the Sea dry Land, we have an eminent Instance in the Dutch Netherlands, which, I easily consent with Verstegan, so far as they are eaven and plain without any Hills, have undoubtedly heretofore, in Time long past, been Sea; as appears, 1. From the Lowness of their Situation, some of the more Maritime Parts of them, as Zealand and Holland, and Part of Flanders, being so low, that by Breach or Cutting of the Sand Banks or Downs, which the Sea by little and little hath

hath cast up, and the Labour of Man here and there supplied, might easily be drowned and converted into Sca again; and of the great Harms that these Parts have heretofore, by the Irruption of the Sea, sustained. But now not only those low Places that adjoin upon the Sea, as Holland and Zealand, but the greater Part of Flanders and Brabant, though they lie not fo low as they, but of fuch Height as no Inundation of the Sea can any whit annoy them, though the Sand-Banks and Downs on the Sea-Side were never fo much broken or cut through, yet are they as eaven and level as even Holland and Zealand themselves, which is a sufficient Demonstration, that they were once covered with Water: For that Water will thus level Ground it often runs over, is clear from Meadows, and from the Bottom of the Sea discovered at low Water; and we have Experience of no other Cause that doth or can effect it. And therefore Lewis Guicciardine erroneously argues Hubert Thomas, Secretary to Count Frederick, Palatine of the Rhine, of a Mistake, for saying, in his De-scription of the Country of Liege, that the Sea hath come up even to Tongres Walls, now well nigh a hundred English Miles from the Sea: Among other good Reasons, alledging for the Proof thereof, that the great Iron Rings are there yet remaining, unto which the Ships that there sometimes arrived were fastned. I say erroneously, seeing all the Countries between that and the Sea are level, and of an equal Superficies, without any Hills or Risings. 2. This appears, not only from the great Plainness and Eavenness of the Ground, but in that the Soil generally, both in Flanders and Brabant, is sandy; whence it seems naturally to follow, that those Countries were anciently the Flats, Sands, or Shores of the Sea. 3. In that digging about two Fathom more or less deep in the Earth, innumerable Shells of Sea-Fish are found, and that commonly in all Places, both of Field and Town; and in many Pla-

ces the great Bones of Fishes.

FARTHER (faith Verstegan) it is to be noted, that albeit digging deep in the Earth in Brabant and Flanders, great Abundance of Shells and Bones of Fishes are to be found; yet digging in the Earth in Holland and Zealand, none at all are perceived, howbeit on the Sands on the Sea-Shore there are very many. The Reason whereof may be, because those Parts have been in Time long past part of the Depth of the Sea; and the Parts aforesaid of Brabant and Flanders, the Flats or Shore; and on the Flats, and not in the Depths, such kind of Shell-Fish are naturally nourished. This is a very plausible Account. But yet it hath been by Experience found, that if you dig deep enough, even in Hol-land itself, after many Floors of several Sorts

of

of Earth, you will at last come to Beds of Shells. For Varenius tells us, that Sinking a Well in Amsterdam, after many Beds or Layers of Earth, Sand, Turf, &c. at a hundred Foot Depth they came to a Bed of Sea-Sand mix'd with Cockle-Shells of four Foot Thickness, which doubtless was of old Time the Bottom of the Sea, and all the other Beds above it were brought down partly by Floods subsiding and settling there, partly by the Working of the Sea spreading Beds of Sand upon the Layers of the Earth, and fo interchangeably. But from this Experiment it doth appear, that however deep the Sea were thereabouts, yet it was not too deep to breed or harbour Shell-Fish. Moreover, from this Instance it appears, that altho' now the Bottom of the Sea about Holland be not much below the Surface of the Land, yet anciently it was supposed fifty Foot; whence it will follow, that the Sea did then cover all the Land above Holland, which was not more than fifty Foot higher than it. This to me is a demonstrative Proof of the Atterration of the Sea thereabout.

ANOTHER great Instance of Change made in the Superficies of the Earth by Atterration is in our own Country, the great Level of the Fens running through Holland in Lincolnshire, the Isle of Ely in Cambridgeshire, and Marshland in Norfolk. Which that it was sometime part of the Sea, and atterra-

P 4

ted by Land brought down by Floods from the upper Grounds, seems to me evident, in that it is near the Sea, and in that there is thereabout a Concurrence of many great Rivers, which in Flood-times, by the Abundance of Mud and Silt they bring down, there fubsiding, have by Degrees raised it up. And thirdly, in that the whole Country is exactly level, like the Bottom of the Sea; it being (as I have already faid) the Nature of the Water flowing over the Earth in time to level and bring to a Plain all Places that are foft and yielding, and not rocky, as is feen in Meadows, and in the Bottom of the Sea discovered at low Water.

A THIRD Instance is the Craux in Provence in France, anciently called Campus Lapideus, of which Pliny faith it was Herculis praliorum memoria; and Strabo, out of Æschylus, gives us a Poetical Fable, 'That the Stones were rained down by Jupiter in Favour of 'Hercules when he wanted Darts, that he 6 might cast them at the Ligurian Army, and thereby break and scatter it." Possidonius thinks it was once a Lake, which by Fluctuation dried up, and so the Stones came to be equally dispersed over the Bottom of it. That it was a very ancient thing, is clear, having its Original in the fabulous Times before any Memoirs of true History; it continues to this Day such a kind of Place as it was in Strabo's Time. It appears so evident-

ly to any one who hath viewed and confidered it, to have been once Part of the Sea, from its being exactly level, and strowed all over with Stones, as I have observed the Bottom of the Sea in many Places to be, that there is not the least Reason to doubt of it.

THE River Arnus, in Tuscany, now falleth into the Sea, six Miles below Pisa: Whereby it appeareth, (saith Dr. Hakewil) that the Land hath gained much upon the Sea in that Coast; for that Strabo, in his Time, reporteth, it was but twenty Furlongs (that is, but two Miles and an half) distant from the Sea.

I MIGHT, to these, add many other Inflances of Atterrations out of Strabo, in his first Book; as about the Outlets of Ister, the Places called Stethe, and the Deserts of Scythia: About those of Phasis, the Sea-coast of Colchis, which is sandy, and low, and soft: About Thermodon and Iris, all Themiscyra, the Plain of the Amazons, and the most part of Sidene.

To omit the whole Land of Egypt, which probably was covered originally with the Sea, and raifed up by the Mud and Silt, brought down by the Nile in its annual Floods, subsiding there, as I shall have occation to shew afterwards.

MOREOVER, Varenius rationally conjectures, that all China, or a great Part of it, was originally thus raifed up and atterrated, having

having been anciently covered with the Sea: For that, that great and impetuous River, called the Yellow or Saffron River, coming out of Tartary, and very often, though not at anniversary Seasons, overflowing the Country of China, is said to contain in it so much Earth and Sand, as make up a third Part of its Waters. The Eavenness, and Level Superficies of this whole Country of China render this Conjecture the more probable.

In fine, the like Atterrations appear to have been made about the Mouths of *Indus* and *Ganges* in the *East-Indies*, and the River de la Plata in America, and the Rhodanus in France, and, doubtless, most other great

Rivers throughout the whole World.

To all which, if we add the spacious Plains that are on each side most great Rivers, from their Mouths, many Miles up their Channels, as may be observed in the Thames and Trent in England, which, probably, were at first Sinus's of the Sea, landed up by Earth brought down from the Mountains and upper Grounds in Times of Floods; it will appear, that in this respect there hath been a very great Change made in the terraqueous Globe, the dry Land much enlarged, and the Sea straitned and cut short.

Notwithstanding all these Authorities and Arguments, Dr. Woodward, in his Natural History of the Earth, confidently affirms, That there were never any Islands, or other

con-

considerable Parcels of Land amassed or heaped up, nor any Enlargement or Addition of Earth made to the Continent, by the Mud that is carried down into the Sea by Rivers. That although the Ancients were almost unanimously of Opinion, that those Parts, where Egypt now is, were formerly Sea, and that a very considerable Portion of the Country was recent, and formed out of the Mud discharged into the e neighbouring Sea by the Nile, that yet this Tract of Land had no such Rise, but is as 'old, and of as long standing, as any upon the whole Continent of Africa, and hath been much in the same natural Condition ' that it is at this day, ever fince the Time of 'the Deluge: Its Shores being not advan-'ced one jot farther into the Sea for this 'Three or Four thousand Years, nor its Surface raised by additional Mud, deposed upon it by the yearly Inundations of the Nile. That neither the Palus Maotis, nor ' the Euxine, nor any other Seas, fill up, or by degrees grow shallower. That Salmy-' dessus, Themiscyra, Sidene, and the adjacent Countries upon the Coasts of the Eu-' xine Sea, were not formed out of the Mud brought down by the Ister, Thermodon, Iris, ' and the other Rivers, which discharge themfelves into that Sea. That Thessaly was onot raised by the Mud, borne down by the River Peneus; the Islands Echinades or Curzolari. \* zolari, out of that brought by the River Achelvas; Celicia by the River Pyramus; My\* fia, Lydia, Ionia, and other Countries of Ana\* tolia, by the Caycus, Hermes, Cayster, and the
\* other Rivers which pass through them. To
\* be short, that no Country or Island in the
\* whole World, was ever raised by this
\* means." Thus far Dr. Woodward.

ALL these Particulars he ought not only to have confidently afferted, but also sufficiently proved; which till he can do, I must

crave Leave to suspend my Assent.

FOR my part, I am of Opinion, that the' the Ancients might be mistaken in the sull Latitude of what they have delivered, concerning the Atternation of the Skirts of the Sea in the Places forementioned, about the Outlets of great Rivers; yet, that they had very good Reason for what they wrote:

First, The Nature of those great Levels being apt to suggest such a Thought to any

considerate and unprejudiced Person.

Secondly, There being undeniable Instances of such Atterrations, though in less Quantities; as, 1. That of Ravenna in Italy, which City anciently stood upon the Brink of the Sea-Shore, when it was the Head of an Exarchate; whereas now, by the landing up of the Shallows, it is far distant from it. 2. That at the Mouth of the River Arnus in Tuscany, just now mentioned. 3. That in the Camarg or Island which the River Rhodanus near Arles

Arles in Provence makes, where there hath been fo much lately gained from the Sea, that the Watch-Tower had been, in the Memory of fome Men living, when I was there [1665] removed forward three times, as I was there

credibly informed.

Moreover, fome Confirmation it is of this Opinion, that the Earth in the Levels, about the Mouths of great Rivers, is continually raifed up higher and higher, which is done by the Mud and Silt brought down by the Rivers, especially in Times of Floods, and partly also by Sand and Ouze thrown up by the Sea; which, by this means, contributes to its own straitening.

A RELATION of this Kind of Atterration, I find in the *Philosophical Transactions*. Numb. 277. pag. 1256. communicated by an innominate Person to the learned and ingenious Mr. Ralph Thoresby, and by him to the

Royal Society, in these Words:

Near the River Welland, which runs through the Town of Spalding in Lincolnfhire, at the depth of about 8 or 10 Foot, there were found Jettys (as they call them) to keep up the old River-Bank, and the Head of a Tunnel that emptied the LandWater into the old River: And, at a confiderable Distance from the present River, I guess, about 20 or 30 Yards, there were dug up, about the like Depth, several old Boats: Which things shew, that anciently

the River was much wider than now it is, or ran in another Place. On the other, viz. the North-West side of the River, and more upward, in the Town, were digged up (at about the forementioned Depth) the Remains of old Tan-Vats, or Pits, a great Quantity of Ox-horns, Shooe-Soles, and, I think, the very Tanners Knebs, &c." Which things shew, that the Surface of the Country lay anciently much lower than now it does.

ONE thing farther I will add, that lately, at the laying of the present new Sluice or Goat (as they call it) at the End of Hamore-Beck, as it falls into Boston-Haven; taking up the Foundation of the old Goat, they met with the Roots of Trees, many of them issuing from their several Boles or Trunks spread in the Ground; which, when they had taken up, (Roots and Earth they grew in) they met with a folid, gravely, and strong Soil, of the high Country kind, which was certainly the Surface of the old Country; the certain Depth whereof I cannot tell you, but that it was much deeper than that at Spalding. What else could raise up this Ten Foot Thickness of Earth, but the Mud and Silt brought down by great Rivers, subsiding here? and partly, also, Sand and Ouze thrown up by the Sea, and deposited bere in Spring-Tides?

A PARALLEL Instance of the raising up of the Earth, the learned Signor Ramazzini affords us in and about Modena in Italy.

'In the whole City of Modena, and round about for some Miles distance, in whatever Place they dig, when they come to the Depth of about 63 Foot, they pierce the Ground with a Terebra, about 5 Foot deeper, and then Water springs up with so great Force, that, in a moment, the Well is filled up to the Brim. This Water is perpetual, doth not increase by Rain, nor decrease by 'Draught." Of this Springing up of the Water about Modena, we have already made mention, and given an Account out of Signor Cassini. And what is yet more remarkable, from the Surface of the Ground to ' the Depth of 14 Foot, they meet with no-'thing but Rubbish and Ruins of an ancient City. Being come to that Depth, they find paved Streets, Artificers Shops, Floors of 'Houses, and several Pieces of Inlaid-Work. 'It's very hard to conceive, how the Ground of this City was raifed thus; we can attri-'bute it to nothing else, but that it hath been ruined, and then rebuilt upon its Ruins, fince it's not higher, but rather 'lower still than all the adjacent Country. 'AFTER these Ruins, they find a very

folid Earth, which, one would think, had never been removed; but a little lower, they find it black, marshy, and full of Briars.

Signor

'Signor Ramazzini went down one of these' Wells, and, at the Depth of 24 Foot, he found a Heap of Wheat entire: In another, of 26 Foot, he found Filberd-Trees with their Nuts. They find, likewise, every six Foot alternatively, a Change of Earth, sometimes white, sometimes black, with Branches and Leaves of Trees of different Sorts. At the Depth of 28 Foot, or thereabout, they find a Chalk that cuts very eafy. It is mixt with Shells of feveral forts, and makes a Bed of about 11 Foot. After this, they find 'a Bed of marshy Earth, of about two Foot, 'mixt with Rushes, Leaves and Branches. After this Bed, comes another Chalk-Bed, of near the same Thickness with the fore mer, which ends at the Depth of 42 Foot. That is followed by another Bed of marshy Earth like the former. After which comes a new Chalk-Bed, but thinner, which hath 'also another marshy Bed underneath it. 'This ends at the Place which the Workmen ' pierce with their Terebra. The Bottom is fandy, mingled with a small Gravel, in which they find feveral Shells, fuch as are on the Sea-Shores. These successive Beds of marshy Earth and Chalk, are to be found ' in the same Order, in whatever Part of the Earth you dig. The Terebra sometimes 'finds great Trees, which give the Work-'men much Trouble. They see also, at fome times, at the Bottom of the Wells,

great Bones, Coal, Flints, and Pieces of Iron.

Ramazzini thinks, that before the Deluge, the Gulph of Venice reach'd as far as Modena, and beyond it; but that the Waters decreasing, the Earth was raised by the Slime and Sand which they left behind them, and that the Rivers and Brooks did, in process of Time, make the abovementioned Beds. Indeed, I cannot imagine what could make those Beds we find in Maritime Places, (as those we mentioned, which were found in sinking a Well at Amsterdam) and those we see in broken Mountains; but the Sediments of the Inundations of the Sea, or of Land-Floods.

To say, that the Earth about Modena is no higher now than when the Flood left it, seems to me a very unreasonable Assertion. For though we should grant, that the Earth was dissolved at the general Deluge, and that the different Parts thereof did subside, according to their different Gravities and Form, several Strata, or Beds; yet, how comes it to pass, that there should be so many alternate Beds of Chalk, and moorish Ground, one above another, in the Earth about Modena? And, how comes the Country round about to be as high as the present City, which is 14 Foot higher than the Streets of the City, upon whose Ruins it seems to have been built?

N.B.

N. B. This Relation I transcribed out of the History of the Works of the Learned.

That the Rivers do bring down a great deal of Earth from the Mountains, upon Shots of Rain, is demonstratively proved by the lowering of the Mountains, because it can proceed from no other Cause imaginable. But that the Mountains are continually lowered or depressed, I shall hereafter, by two Instances, undeniably prove. And, the learned Jesuite Josephus Blancenus mentions the Lowering of Mountains, as a thing well known to the Mountaineers: For that, formerly, some intermediate Mountain intercepted the Sight of a Castle, or Tower, situate in a more remote Mountain, which, after many Years, the intermediate Mountain being depressed, came clearly into View.

I SHALL add hereto the Judgment of the most curious Observer of these things, Nicolaus Steno, in his Prodromus, &c. p. 106, 107. of the English Translation; This is certain, (saith he) that a great Parcel of the Earth is every Year carried into the Sea, (as is obvious to him that shall consider the Largeness of the Rivers, and the long Passage through the Mid-land Countries, and the innumerable Number of Torrents; in a Word, all the Declivities of the Earth:) And, consequently, that the Earth, carried away by the Rivers, and joined to the Sea-Shores, does every day leave new Lands sit for new Inhabitants.

Bur

Bur you will fay, Hath there been no Compensation made for all this? Hath not the Sea otherwhere gained as much as it hath lost about the Mouths of the Rivers? If not, then the Sea will in time be so far landed up, or straitned, till it be compelled to return again, and overslow the whole Earth.

To which I answer, That where the Shores are earthy, or argillaceous, or gravely, or made of any crumbling and friable Matter, the Sea doth undermine and subvert them, and gain upon the Land; which I could prove by many Instances, some of which I shall afterward touch. But whether the Sea doth, in these Places, gain proportionably to what it loses in the forementioned, according to the vulgar Proverb, is to me somewhat questionable.

To proceed now to discourse a little concerning the Changes that have been made by the Irruptions and Inundations of the Sea, or by its undermining and washing away the

Shores.

THAT there have been of old great Floods, and much Land laid under Water by Inundations of the Sea, is clear, many such be-

ing recorded in History.

The most ancient of all, next to the general Deluge in the Days of Noah, viz. that of Ogyges King of Bæotia, or rather Attica, seems to have been of this Nature: So doth that of a great Part of Achaia in Peloponnesus,

Q 2 wherein

wherein the Cities of Bura and Helice were

overwhelmed and laid under Water.

Cambden out of Gyraldus reports, 'That anciently a great Part of Pembrokesbire ran out, in the Form of a Promontory, towards Ireland; as appears by that Speech of King William Rufus, That he could eafily, with his Ships, make a Bridge over the Sea, fo that he might pass on foot from thence to 'Ireland." This Tract of Ground being all buried in deep Sands, during the Reign of King Henry the Second, was, by the violence of a mighty Storm, so far uncovered, that many Stumps of great Trees appeared fastned in the Earth: Ictusque securium tanquam besterni, (faith Gyraldus) and the Strokes of the Axes in them, as if they had been cut but yesterday; ut non littus jam, sed lucus esse videretur, mirandis rerum mutationibus! So that now it made Shew of a Wood rather than of a Strand; such is the wonderful Change of all

HERE I might take occasion to discourse of subterraneous Woods and Fossil Trees, and not impertinently; because some have supposed them to have been thrown down by the universal Deluge, and to have lain buried in the Earth ever since, tho' erroneously. I shall, therefore, give a twofold Account of their Original: The First, From Inundations of the Sea, or the Force of violent and tempestuous Winds: The Second, By the Labour of

Men,

Men, who felled them down in the Places

where they now lie.

First, By Inundations of the Sea. 'Near Bruges, in Flanders, (as Boetius de Boot, ' who was Native of that City, relates) digging 10 or 20 Ells deep in the Earth, they find whole Woods of Trees, in which the Trunks, Boughs, and Leaves, do fo exact-'ly appear, that one may easily distinguish the several Kinds of them, and very plainly discern the Series of Leaves which have fallen yearly. These subterraneous Woods are found in those Places, which, 500 Years 'ago, were Sea, and afterwards either left or thrown up by the Sea, or gained from it; the Tides being kept off by Walls and Fences. But before the forementioned 'Term of 500 Years, there is no Memory that these Places were Part of the Continent. And yet, seeing the Tops of these Trees do, for the most part, lie Eastward, because, as it is probable, they were thrown 'down by the Easterly Winds, (which, on 'this Coast, are most boisterous and vio-'lent) it will necessarily follow, that in the ' most ancient Times, and before all Memo-'ry of Man, these Places were firm Land, and without the Limits of the Sea." So far he. Afterwards, this Land, with the Trees upon it, being undermined and overwhelmed by the Violence of the Sea, the Land and Trees continued fo long under Water.

Water, till the Sea, either by its own Working, bringing up Sand and Stones, &c. or by Earth brought down by the Land-Floods, still subsiding to the Bottom, or by the Tide's being kept off by Walls and Fences, was silled up, and the Tops of the Trees covered; and so this Space again added to the firm Land.

On the Coast of Suffolk, about Dunewich, the Sea hath, for many Years past, very much encroached upon the Land, undermining and overwhelming, by degrees, a great deal of high Ground, insomuch that ancient Writings make mention of a Wood a Mile and a half to the East of Dunewich; which is, at present, so far within the Sea. Now, if in succeeding Ages (as likely enough it is) the Sea shall, by degrees, be filled up by the Means beforementioned, and this Space be added again to the firm Land, these Trees will be found under Ground, in like manner as those about Bruges were.

I FIND, in a Letter from that learned and ingenious Naturalist, Dr. Richardson, registred in the Philosophical Transactions, Numb. 228. 'An Account of some subter'raneous Trees, dug up at Youle in York'shire, about 12 Miles below York, upon the 'River Humber: Some are so large, that 'they are used for Timber in building Houses; which are said to be more durable than Oak itself: Others are cut into long 'Chips,

Chips, and tied up in Bundles, and sent to the Market Towns several Miles off, to ' light Tobacco. Those that I have viewed, were all broken off from the Roots, I suppose, by Violence of Storm, or Water, or both; and, upon Enquiry, do find, that they are all after the same manner. They 'affirmed to me, that their Tops lay all one way, viz. with the Current of Water. So it seems, that these are of this first 'Kind, that were thrown down by Floods, and the Force of Water, and not cut down by the Hand of Man.

"UPON the first Sight of these ( saith the Doctor) I was induced to believe, that they are really Fir-Trees. The Bate or Texture of the Wood is the same with Fir, eafily splitting. If burnt, it sends out the same resinous Smell; and it affords the same Coal. The Branches generally grow in Circles, as the Knots do yet testify. The Knots do easily part from the Wood, as is usual in Fir-Wood. 'The Straitness and Length of these Trees, are also a Presumption that they " must be such."

In the Isle of Man are also found of these subterraneous Trees, whereof we have an Account in a late Description of that Island. In a Bog of 6 Miles long, and 3 Miles over, called the Curragh in Kirk-Christ Lezayre, are Fir-Trees frequently found, which Q4

tho' they lie 18 or 20 Foot deep, yet their Roots are still growing upright in the Ground, and all firm and entire, but the Bodies broken off, with their Heads lying to the N. E.

THESE Trees (as it seems to me) were broken down, and prostrated by the Force of violent and tempestuous Winds, and the boggy Earth raised above them, in the manner we have before shewn. Hence the Head of them lie to the N. E. because the most violent Winds blow from the Atlantick Ocean which lies to the S. W. of this Island. The Manner of the Discovery of these Trees is very remarkable, since there are no Dews ever seen upon those Parts of the Surface of the Bog where they are found, though they lie 20 Foot interred.

Secondly, Some, and that the greatest Number of those subterraneous Trees, were burnt or cut down by the Labour of Man, in the

Places where they now lie.

In England, there are found of them in most of the great Morasses, Mosses, Fens, and Bogs, in Somersetshire, Cheshire, Lancashire, Westmorland, Yorkshire, Staffordshire, Lincolnshire, and other Counties. The Wood of them is usually called Moss-Wood, and is black as Ebony.

THESE Trees, I say, were anciently burnt or cut down by the Labour of Man, as Mr. De la Pryme does clearly make out, in a

Letter

Letter to Dr. Sloane, registred in the Philo-sophical Transactions, Numb. 275. In that many of these Trees have been burnt, fome quite through, fome all on one fide; fome have been found chopt and squared, fome bored through, others half riven with great wooden Wedges and Stones in them, and broken Ax-Heads .... And it is very observable, that upon the Confines of the Low Country, between Burningham and Brumley in Lincolnshire, are several ' great Hills of loofe Sand, which, as they are yearly worn, and blown away with the Wind, there are discovered under them many Roots of great Firs, with the Impresses of the Ax, as fresh upon them as if they had been cut down but a few Weeks; ' which I have feveral times, with Pleafure, ' taken notice of, as I rode that way."

You will ask, Who felled these Trees? and for what Reason did they fell them? Mr. De la Pryme tells us, and proves it by sufficient Authorities, 'That the Romans did' it, to take away these Shelters from the Britans, and to secure their Conquests. For (faith he) the ancient Roman Writers and Historians frequently tell us, That when their Armies and Generals pursued the wild Britans, they always sted into the Fastnesses of miry Woods, and low watry Forests. Cesar himself confesses the same, and says, 'That Cassibelane and his Britans,

Britans, after their Defeat, passed the 'Thames, and fled into fuch low Morasses and Woods, that there was no possibility of following them. We find also, that the front Nation of the Silures did the fame. when they were fet upon by Oftorius and ' Agricola. The like did Venutius, King of ' the Brigantes. And Herodian plainly tells 'us, That it was the Custom of the wild Britans, to keep in the fenny Bogs, and thick marshy Woods; and when Opportunity offered, to issue out, and fall upon the Romans; who were at length so plagued with them, that they were forced to issue out Orders for the destroying and cutting down all the Woods and Forests ' in Britain, especially all those that grew on low Grounds and Morasses. This Order was executed, and they were accordingly cut down, as is evident in ma-'ny Writers, who tell us, That when Sue-' tonius Paulinus conquered Anglesey, he cut down all the Woods there. Galen the Physician cells us, That the Romans kept their Soldiers continually employed in cutting down of Woods, draining Mar-' shes and Fens, and in paving of Bogs. It ' is manifest also, they did not only do this ' themselves, but imposed the same heavy Galgacus, in his Speech to his Soldiers, tells them. That the Romans made Slaves

of them, and wore out their Botlies in cutting down of Woods, and in cleanfing of Bogs, amidst a thousand Stripes and Indignities. But that which is most ob-fervable, is, what Dion Cassius tells us, viz. That the Emperor Severus lost 50000 of his Men, in a few Years time, in cutting down the Woods, and cleanfing the Fens and Morasses of this Nation." Thus far Mr. De la Pryme; who adds much more of the famous Levels of Hatfield Chace, and the adjoining Countries, which may be feen in the Letter quoted before. Moreover, not only the Romans have taken this Course of cutting down the Woods, for the Reasons alledged, but other great Generals and Conquerors of Countries. So our Henry II. when he conquered Ireland, cut down all the Woods that grew upon the low Countries thereof, the better to secure his Conquest and Possession of the same, to keep the Country in a fettled Peace, and to disarm the Enemy, who commonly trusting to fuch Advantages, are apt to rebell. For, fafe Retreats are often observed not to make more Thieves than they do Rebels; as Mr. De la Pryme well writes. The like did Edward I. (as Hollinshed and other Historians tell us) when he conquered Wales; for being not able to get near the Welsh to fight them, by reason of their Skulking and Continuance in boggy Woods, he commanded them them all to be destroyed, and cut down by the Fire and Ax.

THE like Original, no doubt, had those great Numbers of subterraneous Trees, which the Describer of Amsterdam tells us, are found and digged up in Mosses and Fenny Grounds, where they dig for Turves in Friesland and

Groningland.

IF it be demanded, how these Trees came to be funk so deep in the Mosses, I answer, partly by the Rotting of their smaller Branches and Leaves, partly by the Earth and Silt brought down by Rivers, especially in Times of Floods, subsiding and spreading itself over these Trees; partly by Rain-water precipitating a copious Sediment, for the Nourishment of Moss growing abundantly, with other Plants on the Morafs, and shooting down innumerable Roots, and those amassed together to a great Depth; as we see in Turf-Pits, that which is the most firm Part of the Turfs, and holds them together, being these Roots. Indeed it seems to me, that the lower Part of the Superficies of the Moss is changed continually into Roots, and raises up the Moor.

It may be objected, that the greatest Part of the Moss-Wood seems to have been Fir; but Fir-Trees are not Native of England. To which I answer, That this is a great Mistake. For that anciently there were abundance of Firs growing, even in the great

Level

Level about Hatfield-Chace, or in other the like Places, Mr. De la Pryme hath sufficiently proved, in a Letter to Dr. Sloane, register'd Philosoph. Transact. Numb. 277. And I myself have seen a Remnant of these Fir-Trees growing on a Hill near Wareton, a Village in Staffordsbire, about 2 Miles distant from Newport in Shropshire.

So, I think, I have given a sufficient and satisfactory Account of all the Phanomena of these subterraneous or Fossil Trees, or on

Moss-Wood.

SINCE the Writing of this, happening to read Part of the Learned Dr. Leigh's Natural History of Cheshire, Lancashire, and the Peak of Derby, I find that the Doctor adheres to the ancient Opinion concerning the Original of these Fossil-Trees, viz. That they were brought in by the general Deluge, and deposited in the Places where they now lie, and rejects that of Dr. Plot, which we embrace; That these Moraises were the Product of the Woods that grew upon them, which by Putrefaction of the Leaves, Rains and Dews, may (as we daily see) be converted into Bogs and Morasses; and that the Firs found there, were not brought thither by any Deluge, but were the Products of the Soil, and in Probability ruined by the Britans in Revenge to the Danes, the Pine being their Darling Tree.

THAT

## Consequences of

THAT these Trees grew originally in the Places where they are now found, I am of Accord with Dr. Plot, but cannot agree with him that they were thrown down by the Britans for the Reason he alledges. I rather think them to have been prostrated and overwhelmed by the Force of the Waters in some Inundation of the Sea, (not in the univerfal Deluge in the Days of Noah) and afterwards the Sea by Degrees receding, to have been covered with the Sediment of the Waters, and their own Branches and Leaves, with Moss and other Plants rotting upon them. This Hypothesis answers Dr. Leigh's second and third Arguments against Dr. Plot's Opinion, viz. 2. That he had seen seven or eight Fir-Trees of a vast Thickness contiguous to each other, fo that who foever confiders the Circumference of them, must neceffarily conclude, they could not grow there in that Order, it being impossible there should be a Distance between each Tree for their ascending Boughs. 3. Under these are frequently found the Exuvia of Animals, as Shells and Bones of Fishes, Gc. which could not come from any other Cause but a Deluge. If he had faid, some particular Inundation of the Sea, I could easily have agreed with him. For that there have been such particular Inundations of the Sea is manifest from several Histories, and particularly that transcribed out of Cambden a little before, to which

which I referr the Reader. As to his Opinion, that Firs are not, nor ever were, Native of England, I have already said, that I think it a great Mistake; Mr. De la Pryme producing many Testimonies that they were, particularly in the great Levels about Hatfield-Chace, and in Lincolnshire, &c. For the Readers Satisfaction, I shall here relate his Words.

'BEING the other Day at Hatfield, I was told by several Gentlemen, that about 20 ' Years ago died one Sanderson of that Town, aged near 80 Years, whose Father, much of the same Age, did frequently assure him, and other Gentlemen that were curious in the Matter, that he could very well remember many hundreds of great Fir-'Trees, standing one here and another there, in a languishing decaying Condition, half as high as Houses, and some higher, whose Tops were all dead, yet their Boughs and Branches always green and flourishing, growing all of them in these Levels. And John Hatfield, of Hatfield, Esq; Counsellor at Law, who is not above 40 Years of ' Age, has by him a large Twig that his Father plucked off from the Sprout of a green and flourishing Shrub of Fir, that grew at the Root of one of the same Kind in these Commons. And an old Man of Croul tells me, that he has heard his Father fay, that he could remember Multitudes of Shrubs'

Shrubs and small Fir-Trees growing here, while this Country was a Chace, and while the Vert was preserved before the Drainage. And lastly, in many old Charters that I have seen of the pious Roger e de Mowbray, Lord of Axholm, who lived ' in the Year 1100, relating to Hurst, Belwood, Ross, Santoft, &c. that then all these Places were covered with a great old decaying Forest or Wood, and not them on-' ly, but also all that low Common between Croul-Caussey, and Authrop upon Trent. And tho' there be not one Stick of any fuch thing now to be found, yet it is not only ' plainly manifest, that the same was true from the Roots there found, but also from the faid Roots that most of the Trees that then grew there were Firs." Thus far Mr. De la Pryme. To which, if we add what Dr. Richardson observed of the subterraneous Trees found at Youle in Yorkshire, together with the Remnant of these Trees at this Day growing near Wareton, which we before-mentioned, all together make up a demonstrative Proof that Fir-Trees were not only Native of England, but grew abundantly in the great Levels in many Counties thereof.

As for the Authority of Julius Casar to the contrary, I make little Account there-

of.

For, 1. It's likely he never march'd for far up the Country, as to come to the Le-

vels in which these Fir-Woods grew.

2. HE denies the Fagus to this Island, whereas the Beech-Tree, which is most certainly by the Authority of all Botanists the true Fagus of the Latins, grows plentifully here in many Places; and not a distinct Sort of Fagus, as Dr. Leigh fancies, from no better Proof than the Epithet Patula, or Spreading, (which Virgil attributes to the Fagus) which our Beech is not. But by his Leave, I myself have seen Beech-Trees with Heads sufficiently spread, to denominate them Patula.

To conclude: It's a vain thing to dispute by Argument against clear Matter of Fact; or to go about to prove, that all these Fossil-Trees were brought in by the universal Deluge, when we have sufficient Testimony, that the greatest Part of them that are found with us were cut or burnt down by the Hand of Man; the very Stroaks of the Axes appearing in them, as if they had been fell'd but Yesterday. So I shall leave this Subject, and return from whence I have digreffed.

In the Time of King Henry the first of England, there happen'd a mighty Inundation in Flanders, whereby a great Part of the Country was irrecoverably lost, and many of the poor distressed People, being bereft of

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their Habitation, came into England, where the King, in Compassion of their Condition, and also considering that they might be beneficial to his Subjects, by instructing them in the Art of Cloathing, first placed them about Carlisle in the North, and after removed them into South-Waler, where their Posterity hath ever since remained.

In the Year 1446, there perished 10000 People by the Breaking in of the Sea at Dordrecht in Holland, and thereabouts; and about Dullart in Friesland, and in Zealand, above 100000 were lost, and two or three hundred Villages drowned, some of their Steeples and Towers, when the Tide is out, still ap-

pearing above Water.

Mr. Carew of Antony, in his Survey of Cornwal, affirmeth, That the Sea hath ravened from that Shire the whole County of Lioness. And that such a County there was, he very sufficiently proves by many strong Reasons. Cambden, in his Britannia, reports out of ancient Records, 'That upon the Kentish Coast, not far from Thanet, is a sandy 'dangerous Place (which the Inhabitants call Goodwyns Sands) where an Island (being the Patrimony of Earl Goodwyn) was swallowed up in the Year 1097.

But the greatest Change of this Kind that ever was made (if it be true) was the Submersion of the vast Island of Atlantis, where-

of we have already spoken.

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As for the Changes that have been made by undermining and washing away the Shores, they have been partly the diminishing of the Land, and partly the raising up of several Islands not far from the Shores. So the Baltick Sea hath invaded the Shores of Pomerania, and destroyed a famous Mart-Town, called Vineta. So the ancient Borough of Donewich, in Suffolk, is almost quite eaten away and ruined by the Encroachments of the Sea. And it is faid, that the Ocean hath cut off twenty Miles from the North Part of the Island of Ceylan in India, so that it is much less at this Day than formerly it was. And many the like Examples there are. And for the Raising up of Islands near the Shore, very likely it is, that the Sea continually preying upon the Shore, and washing away abundance of Earth from thence, cannot carry it far to any great Distance from the Shores, but lets it fall by little and little in their Neighbourhood; which subsiding or fettling continually for some Ages, at last the Heaps ascend up to the very Superficies of the Water, and become Islands. Hence, in the Middle of the Ocean, there are no Islands, or but a very sew, because those Parts are too remote from the Shores for any Earth washed from thence to be carried this ther; and if it were, yet the Sea thereabout is too deep to have any Heap raised in it so high: Besides, the Motions of the Water in R 2 those

those Depths, were there Earth enough, would overthrow any Heap before it could be advanced any thing near the Top. But all I-slands in general, a very few excepted, are about the Shores, or not far from the Shores of the great Continents. Which Thing is especially to be remarked in all the great Heaps or Swarms of numerous Islands, they being all near to the Continents; those of the Ægean Sea to Europe and Asia; the Hesperides to Africa; and the Maldiva, (which are thought to amount to eleven thousand) to India; only the Flandrica or Azores seem to be situate in the Middle of the Ocean, between the Old and New World.

Besides these Changes about the Sea-Coasts, by the prevailing of the Land upon the Sea, in some Places, and the Sea upon the Land in others, the whole Continents seem to suffer a considerable Mutation by the Diminution, and Depression or Sinking of the Mountains, as I shall have Occasion to shew afterward in the Third Discourse.

Ælian, in his eighth Book, cap. 11. telleth us, That not only the Mountain Ætna, but Parnassus and Olympus, did appear to be less and less to such as sailed at Sea, the Height thereof sinking. Of this Lowering and Diminution of the Mountains, I shall not say much in this Place, but taking it for granted at present, only in brief intimate the Causes of it, assigned by that learned Mathematician Fosephus

Josephus Blancanus, which are partly Rain-Water, and partly Rivers, which by continual Fretting by little and little, wash away and eat out both the Tops and Sides and Feet of Mountains, and fill up the lower Places of the Valleys, making the one to encrease, and the other to decrease; whereby it appears (faith Dr. Hakewil) that what the Mountain loseth, the Valley gains; and consequently, that in the whole Globe of the Earth nothing is loft, but only removed from one Place to another; fo that in Process of Time the highest Mountains may be humbled into Valleys: And again (which yet I will not allow him) the lowest Valleys exalted into Mountains. He proceeds, Anaxagoras (as Diogenes Laertius reports in his Life) being demanded what he thought, Whether the Mountains called Lapfaceni would in time be covered with Sea? answered, Yes, unless Time itself fail; which Answer of his seems to confirm the Opinion of Blancanus De Mundi Fabrica, cap. 4. where he maintains, That if the World should last long enough, by reason of this continual Decrease of the Mountains, and the Levelling of the Valleys, the Earth would again be overflown with Waters, as at first it was.

BESIDE these more eminent and remarkable Changes, which in Process of time, after a long Succession of many Ages, threaten some great Effect; indeed, no less than a Re-

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duction of the World to its primitive State before the Separation of the Land and Water; there have been many other lesser Mutations made either by Earthquakes and Eructations of Burning Mountains, or by great Floods and Shots of Rain, or by violent or tempestuous Winds and Hurricanes, some whereof are mentioned by Naturalists and Historians, Strabo, Pliny, Seneca, Ovid, and others.

For Earthquakes, Possidonius, quoted by Strabo, in his first Book, writes, 'That there was a City in Phanicia, situate above Sidon, swallowed up by an Earthquake, and that almost two Thirds of Sidon itself fell therein, though not suddenly, and all at once, so that there was no great Destruction or Slaughter of Men happened. The same extended almost over all Syria, tho' not violently, and reached as far as some of the Cyclades Islands, and Eubaa, where the Fountains of Arethusa in Chalcis were stopped up by it, and after many Days broke forth again at another Source; neither did it cease to shake the Island by Parts, till the Earth opening in the Field Lelantur vomited out of a River of siery Clay.

THE same Strabo tells us, 'That Democles mentions huge Earthquakes of old in Lydia and Ionia, extending as far as Troas, by which many Villages were swallowed

up

up, and Sipylus overthrown when Tantalus reigned, and great Lakes made of Fens.

And that Duris saith, 'That the Rhagades Islands by Media were so called from the Lands about the Caspia Porta being torn and broken by Earthquakes, so that many 'Cities and Villages were overthrown, and

feveral Rivers received Alterations.

AND Demetrius Calatianus, relating the Earthquakes that happen'd throughout Greece, writes, 'That a great Part of the Lichades 'Islands and Cenaus had been drowned thereby; and that the hot Baths at Ædep-' sus, and in Thermophyla, having been stopt for three Days, flowed again, and those of · Ædepsus from new Sources. That the ' Wall of Oreus on the Sea-Side, and seven hundred Houses, were thrown down; and a great part of Echinus and Heraclea Trachinia; but the whole Building of Phalarnus was overturned from the very Soil or Plain of it; the like happened to the Larians and Larissans; and that Scarphia was utterly demolished and subverted from the very Foundations, and not fewer than 1700 Persons overwhelmed and buried; and more than half that Number of the · Thronii.

Pliny, in his first Book, cap. 84. tells us, That in the Reign of Tiberius Casar, there happened an Earthquake (the greatest that ever was in the Memory of Man) wherein

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' twelve Cities of Asia were prostrated in

one Night.

But what is that to what S. Augustine writes, [Lib. 2. De Miraculis SS. cap. 3.] if that Book be his, 'In famoso quodam terramotu centum Libya Urbes corruisse: That in a famous Earthquake a hundred Cities of Libya were demolished.

THE City of Antioch, where the Disciples of Christ were first called Christians, with a great part of Asia bordering upon it, was almost wholly subverted and swallowed up by an Earthquake in Trajan's time, as Dion Cassius writes; Trajan himself then winter-

ing there.

THE same City of Antioch, in the Time of Justinian, in the Year of our LORD 528, was again shaken with a terrible Earthquake, wherein were overwhelmed and buried in the Ruins of the Houses above 40000 of the Citizens.

And lastly, in the 61st Year after the last mentioned Earthquake, being again shaken by a new one, it lost 60000 of its Inhabitants: Gregory, the then Bishop, being by the Divine Favour, and in a manner miraculously preserved, the House wherein he abode falling down presently after his going out of it.

Eusebius and Spartanus make Mention of an Earthquake in the Emperor Adrian's Time, wherein Nicomedia and Nicaa of Bithynia,

thynia, and Nicopolis and Cafarea, Cities of

Palastina, were thrown down and ruined.

In the Year 1182, when Saladin set himself to overthrow the Kingdom of Jerusalem, there happened an Earthquake, in which Antiochia, Laodicea, Alapia, Cafarea, Emissa, Tripolis, and other famous Cities, were almost wholly thrown down and destroyed.

To omit many that are recorded in ancient Histories, and to come near to our

Times:

Æneas Sylvius, afterwards Pope by the Name of Pius the Second, in a Letter of his to the Emperor Frederick, thus pitifully describes an Earthquake that fell out in his time; Audies ex latore prasentium quam mirabilia & incredibilia damna fecerit Terramotus in Regno Apulia, nam multa oppida funditus corruerunt, alia magná ex parte collapsa sunt. Neapoli omnes fere Ecclesia & maxima Palatia ceciderunt, plusquam triginta millia corpora oppressa ruinis traduntur, populus omnis habitat in Tentoriis, i.e. You shall understand by the Bearer of these Presents, what wonderful and incredible Losses an Earthquake hath wrought in the Kingdom of Apulia; for many Towns are utterly ruined, others for the greatest part fallen. In Naples, almost all their Churches and fair Palaces are overthrown; more than 30000 Persons are said to have been flain; all the Inhabitants dwell in Tents.

This Kingdom of Naples, especially Apulia and Calabria, hath, I think, been oftner shaken, and suffered more by Earthquakes than any other Part of Europe. For Cluverius tells us, That in the Year 1629, there were dreadful Earthquakes in Apulia, by which 17000 Men are said to have perished.

AND Athanasius Kircher the Jesuite, in the Preface to his Mundus Subterraneus, gives us a sad Narrative of a dismal Earthquake in Calabria, in the Year 1638, wherein himfelf was, and out of which he hardly escaped with his Life: Nothing to be feen in the whole Country he passed by for two hundred Miles in Length, but the Carcasses of Cities, and the horrible Ruins of Villages, the Inhabitants wandring about in the open Fields, being half dead with Fear and Expectation of what might follow. But most remarkable was the Subversion of the noted Town of S. Eufamia, which was quite lost out of their Sight, and absorpt, and instead thereof, nothing left but a stinking Lake. But for a full Account thereof, I referr the Reader to the said Preface.

Nor many Years ago, the famous City of Ragusa was almost wholly subverted and destroyed by a terrible Earthquake; and Smyrna has lately been demolished by one. From the West-Indies we hear frequently of great Damages done in our Plantations by Earthquakes. The printed Transactions and Jour-

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nals are full of these great Concussions and Subversions.

In the Year 1692, on the Seventh Day of June, there happened a dreadful Earthquake in the Island of Jamaica, which made great Ruins and Devastations throughout the whole Country, but especially in the Capital Town of Port-Royal, which was almost fwallow'd up and overflow'd by the Sinking of the Earth, and Irruption of the Sea: A full Account whereof contained in two Letters sent from the Minister of the Place, the one dated June the 22d, the other the 28th of the same Month, 1692, from Aboard the Granada in Port-Royal Harbour, to a Friend of his in England, and published by Authority, I shall give the Reader, with fome Remarks.

1. He tells us in general, That this Earthquake threw down almost all the Houses, Churches, Sugar-Works, Mills and Bridges throughout the whole Island: That it tore the Rocks and Mountains [others tell us, that it leveled some Mountains, and reduced them to Plains] that it destroy'd some whole Plantations, and threw them into the Sea; but that Port-Royal had much the greatest Share in this terrible Judgment.

2. THEN he acquaints us, what for to fave the Reputation of the People, and to avoid the laying a perpetual Blot upon them, I should rather suppress and conceal, but for

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the Vindication of the Divine Providence and Justice, and to deterr others from the like Enormities, I think necessary to publish, That the Inhabitants of that Place were a most ungodly and debauched People, and so desperately wicked, that he was even afraid to continue among them; for that very Day this terrible Earthquake was, as foon as Night came on, a Company of lewd Rogues, whom they call Privateers, fell to Breaking open Warehouses and Houses deserted, to rob and rifle their Neighbours, whilst the Earth trembled under them, and some of the Houses fell upon them in the Act. [The like Robbers and Plunderers we were told wander'd up and down the Country, even in the very Smoke, during the last great Burning and Eruption of Ætna in Sicily.] And those audacious Whores that remained still upon the Place, were as impudent and drunken as ever; and that fince the Earthquake, when he was on Shore to pray with the bruiled and . dying People, and to Christen Children, he met with too many Drunk and Swearing. And in his fecond Letter, he faith positively, That there was not a more ungodly People on the Face of the Earth.

3. THE Account he gives of the Motions and Effects of the Earthquake is as followeth: The Day when this Calamity befell, the Town and Island was very clear, affording not any Suspicion of the least Evil. [This

is observed of most Earthquakes, and particularly of our last here in England, the Morning before it, being clear and calm.] But in the Space of three Minutes, about half an Hour after Eleven in the Morning, Port-Royal, the fairest Town in all the English Plantations, [and well might he call it fo, if, as he writes in another Place of his Letter, most of the Houses upon the Wharf were built of Brick, and as fair as those in Cheapside, London the best Emporium and Mart of this Part of the World, exceeding in Riches and abounding in all good Things, was shaken and shattered to Pieces, and covered for the greatest part by the Sea. The Wharf was entirely swallowed by the Sea, and two whole Streets beyond it. Himself, with the President of the Council, being in a House near where the Merchants meet, hearing the Church and Tower fall, ran to fave themselves: He having lost the President, made toward Morgan's Fort, because being a wide open Place, he thought to be there securest from the falling Houses, but as he was going he faw the Earth open, and fwallow up a Multitude of People, and the Sea mounting in upon them over the Fortifications Moreover he tells us, That their large and famous Burying-Place, called the Palisado's, was destroyed by the Earthquake; and that the Sea washed away the Carcasses of those that were buried out of their Graves, their Tombs

Tombs being dashed to Pieces by the Motion and Concussion. That the whole Harbour, one of the fairest and goodliest that ever he faw, was covered with the dead Bodies of People of all Conditions floating up and down without Burial. That in the Opening of the Earth, the Houses and Inhabitants finking down together, some of these were driven up again by the Sea which arose in those Breaches, and wonderfully escaped: Some were swallowed up to the Neck. and then the Earth shut upon them, and squeezed them to Death; and in that Manner several were left buried with their Heads above Ground, only fome Heads the Dogs have eaten, others are covered with Dust and Earth by the People which yet remain in the Place, to avoid the Stench. So that they conjecture, that by the Falling of the Houses. the Opening of the Earth, and the Inundation of the Waters, there are lost Fifteen hundred Persons, and many of good Note, as Attorney General Musgrove, Provost Marshal Reeves, Lord Secretary Reeves, &c.

FARTHER he tells us, That after he was e-fcaped into a Ship, he could not sleep all Night for the Returns of the Earthquake almost every Hour, which made all the Guns in the Ship to jar and rattle. And he suppofes that the whole Town of Port-Royal will in a short time be wholly swallowed by the Sea; for few of those Houses that yet stand

are left whole, and that they heard them fall every Day, and that the Sea daily encroached upon them. That they had Accounts from several Parts of those Islands of Mischiefs done by the Earthquake. From St. Anne's they heard of above 1000 Acres of Wood-Land changed into Sea, carrying with it whole Plantations. And, lastly, That he was told by fome, that they still heard Bellowings and Noises in the Mountains, which made them very apprehensive of an Eruption of Fire; which if so, he feared might be more destructive than the Earthquake. But I think causlesly, for I never heard or read of any great Destruction of Men made by any Eruptions of Fire, even out of burning Mountains.

4. The Account he gives of his own unexpected and strange Preservation, take in
his own Words: After I had been at Church
reading Prayers, (which I did every day since
I was Rector of the Place, to keep up some
Shew of Religion) and was gone to a Place
hard by the Church, where the Merchants
meet, and where the President of the Councit
was, who came into my Company, and engaged me to take a Glass of Wormwood Wine,
as a Whet before Dinner; he being my very
great Friend, I staid with him: Upon which
he lighted a Pipe of Tobacco, which he was
pretty long in taking; and not being willing
to leave him before it was out, this detain'd

me from going to Dinner to one Captain Ruden's, whither I was invited: Whose House, upon the first Concussion, sunk first into the Earth, and then into the Sea, with his Wife and Family, and some that were come to dine with him. Had I been there, I had been lost. But to return to the President, and his Pipe of Tobacco: Before that was out, I found the Ground rolling and moving under my Feet; upon which, I said to him, Lord! Sir, what is this? He replyed very composedly, being a very grave Man, It is an Earthquake; be not afraid, it will soon be over: But it increased, &c. Then he relates, how he went to his own Lodging, and found all things in Order there, nothing stirred out of its place; and, going into his Balcony to view the Street, he saw never a House down there, nor the Ground so much as crack'd: And that, after he had prayed with the People, at their earnest Request, and given them some serious Exhortations to Repentance, in which Exercises he spent near an hour and half, there came some Merchants of the Place to him, desiring him to go aboard fome Ship in the Harbour, and refresh himself, telling him, that they had gotten a Boat to carry him off; whom he accompanied: And passing over the Tops of fome Houses, which lay leveled with the Surface of the Water, got first into a Canoe,

and then into a Long-Boat, which put him

on board a Ship.

5. THE last thing I shall take notice of in these Letters, shall be the Influence and Effect this Judgment had upon the Remainder of the People, to bring them to a Sense of their Sins, and Repentance for them, and to refolve upon, and begin a Reformation and Amendment of their Lives. It is a true Saying, Vexatio dat intellectum: In their Affli-Etion they will feek me early. The pious Inclination of the People appeared, in that they, were so glad to fee their Minister in the midst of this Disaster, and so earnest with him to come down and pray with them, when they faw him in the Balcony beforementioned; and that when he came down into the Street, every one laid hold on his Cloaths, and embraced him, fo that with their Fear and Kindness he was almost stifled. And that not only at the instant of the Distress, but afterwards when he went ashore to bury the Dead, and pray with the Sick, and baptize the Children, and preach among them, the People were overjoy'd to see him, and wept bitterly when he preached to them. Fear is a more powerful Passion than Love: And whatever creates Terror, is a more effectual Curb to restrain and rule Men as well as Children, than any Favours or Benefits, the most powerful Motives of Love and Affection: For though the Bonds

of Love are called the Cords of a Man, and are indeed very strong ones to rational and ingenuous Persons, yet the greatest part of Mankind are so far degenerated, that they have broken these Bonds, and cast these Cords from them; and upon Trial, one shall find little of Gratitude or Ingenuity among them:

I shall add one or two Remarks upon

the precedent Paper.

First, It is very remarkable, that the Day, when all this befell Port-Royal and the whole Island of Jamaica, was very clear, not affording the least Suspicion of any Evil; so that the Inhabitants had no Warning at all of it, but were furprized of a sudden, without time sufficient to escape and save themselves. For in the short Space of three Minutes, the Town was shaken and shattered to pieces, and funk into, and covered, for the greatest part, by the Sea. In which respect, this Judgment refembled those on the Old World and on Sodom, which, the Scripture tells us, were, to the People involved in them, fudden and unexpected; as also the Second Coming of CHRIST, and future Dissolution of the World by Fire, is predicted to be.

THAT the Cause of Earthquakes is the same with that of Thunder, I doubt not, and most learned Men are agreed; that is, Exhalations or Steams set on fire, the one in the Clouds, the other in the Caverns of the Earth;

which

which is fufficiently proved from the great Deflagrations and Éruptions of Vulcano's or burning Mountains; they being always either preceded or attended by Earthquakes: And Earthquakes, even here in England, being, as far as I can understand, for the most part, accompanied with a Noise. But now of what Nature this Steam is, that is thus inflamed, and what causes the Accension, I must confess myself not to be yet fully satisfied. That it is at least partly Sulphureous is certain, and well proved by Dr. \* Li- \* Philof. fler, from the Sulphureous Stink of Waters. Transact. smelt before, and of the very Air itself after them: That it conceives Fire of itself, and is not kindled after the Manner of Gun-powder by the Touch of Fire, is as clear, there being no Fire præexisting in the Clouds; but how it should kindle, unless by a Colluctation of Parts after the manner of Fermentations, I cannot conceive. And if so, then the Steam must be a dissimilar Body composed of Parts of different Natures; else would there be no Colluctation, and confequently no Accension, the Parts friendly conspiring and agreeing in the same Motion.

I AM not ignorant, that Water, either in the gross Body, or in Vapour, may and doth so far work upon some solid Bodies, as for Example, Quick-Lime, Hay in a Mow, the Pyrites or Fire-stone, &c. as to cause an Incalescency, and even an Accension; but still N. 157.

this is by the Discord or Contrariety of the Parts of Water or Vapour, and those of the forementioned Bodies meeting and struggling together. So in Tempests of Thunder and Lightning, the Fume contain'd in the Clouds, which my honoured Friend Dr. Martin Liefter supposes and proves to be no other than the Breath of the Pyrites encountring with the Vapour of Water, there may very likely, by the Concourse and Consist of these two, be produced first a great Heat, and after-

wards an actual Fire.

As for Thunder, after the Steams inclosed in the Cloud are once inflamed, I conceive the Fire goes not out till the End of the Tempest; but when the inflamed Matter is so much dilated, that the Cavity of the Cloud cannot contain it, it rends the Cloud, and forces its Way through where it is most yielding, so much of the Fire escaping at the Breach, till the Cloud overcomes the Resistance of the Remainder, and closes itself again; and continues shut, till there be so much of the fulphureous Steam anew inflamed, as to have Strength enough to tear it, and break out the fecond time, which Process is repeated, till the whole Steam be burnt and confumed, and the Fire go out; or till the Cloud be quite condensed and fallen down in Rain. That this Vapour, or Steam in the Clouds, heats gradually before it comes to Accension, I think probable, because before

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any confiderable Tempest the Air beneath is fultry, (as we call it) that is, suffocatingly

hot.

So likewise in the Caverns of the Earth, it is not unlikely that the Steams or Damps that cause Earthquakes before Ignition, may be gradually heated by a Colluctation of Parts; but their Accension seems to be very fudden, and in manner of Explosion, like that of Gun-powder; the Succussion coming unexpectedly without any Notice-giving, and being also very transient, and of short Continuance. I mean Earthquakes where there are no Eructations of Fire, such as ours in

England are.

THERE is a Sort of Damp which some call a Fire-Damp or Fulminating-Damp, of which I had the first Notice from my honoured Friend Francis Jessop Esq; An. 1668. whereof I find a Relation fince communicated by him in a Letter to Dr. Lister, published in the Philosophical Transactions, Num. 117. and a farther Account from him in Anfwer to some Queries proposed by the Ho-nourable Mr. Boyle, in the Philosophical Transactions, Numb. 119. wherein he writes, That this Sort of Damp presently takes Fire at the Touch of a lighted Candle, or other flaming Matter, and flies out of the Mouth of the Bink or Shaft, with a Crack like a Gun. He instances in three Persons that had been hurt by it; one in the Coal-Mines in Hasleberg Hills,

who

who had his Arms and Legs broken, and his Body strangely distorted by it: A second in those at Wingersworth, who going into a Bink, where this Kind of Damp was, to fetch fome of his Tools with a Candle in his Hand, found himself on a sudden environ'd with Flames, fo that his Face, Hands, Hair, and a great part of his Cloaths were very much burnt. He heard very little Noise, but one who was working at the same time in another Bink, and those that were above Ground, heard a very great one, like a Clap of Thunder, wherewith the Earth shook; which hearing, they ran in a great Amazement to fee what the Matter was, with their Candles in their Hands, which were twice extinguish'd, but held upon the third Lighting. They faw nothing, but met with an intolerable Stench of Brimstone, and a Heat as scalding as an Oven half heated, which made them glad speedily to quit the Place. A third at the same Place met with the same Accident: 'And the fore-mentioned Person happening then to stand at the Mouth of the fired Bink, was shot forth about two or three Yards, and had his Head broken and Body bruised against the farther Side; the fame also a third time incurred the like Disaster. That it shot off the Turn at the Mouth of the Pit to a considerable Height: That they could perceive no Smell before the Fire, but afterwards a very strong one of Brimstone. That the Danip

Damp hung about the Top of the Bink, and therefore they were forc'd to go with their Candles very low, else it would have taken Fire. That the Flame would continue in the Vault two or three Minutes, sometimes more after the Crack. That he could never hear of any Damps that kindled of themselves. That from the Breaking of these Fulminating-Damps proceeded a black Smoak of the Smell and Colour of that from Gun-powder fired.

This Sort of Fire-Damp, Mr. Beaumont tells us, they have also in some Coal-Works bordering on Mendip Hills. See Philosoph. Collect. 1. And Mr. George Sinclair, in a Land called Werdy, West of Leith, which even in the Day-time is fometimes feen in Coal-works in little Holes, shining like kindled Sulphur. But the most strange Fire-Damp was that which happen'd at Mostyn in Flintshire, at the fame time with that at Wingersworth [1675.] which as foon as the Colliers were scanted of Air, appeared in the Crevisses or Slits of the Coal, where Water had been before, in a fmall bluish Flame, flashing and darting like Sword-Blades from Side to Side of the Pit; and being kindled, had the fame and more violent Effects than those of Hasleberg or Wingersworth, leaving a foul ill-scented Smoak behind it. In the last there mention'd (Philosoph. Transact. Numb. 136.) firing of it by one who ran indifcreetly with his Candle

## Consequences of

over the Eye of the damp Pit, it flew to and fro over all the Hollows of the Work with a great Wind and mighty Roaring, tore the Mens Cloaths from their Backs, findging and burning them, as also their Hair and Skins, carrying some of them 15 or 16 Yards from their first Station, beating them against the Roof of the Coal and the Posts. As it drew up to the Day-Pit, it caught one that was next the Eye along with it, and up it comes and was discharged out of the Mouth of the Shaft with a terrible Crack, not unlike, but more shrill than a Cannon, so that it was heard fifteen Miles off. The Man's Body, and other things from the Pit, were feen in the Air above the Tops of the highest Trees that grew on the Brow of the Hill (eighteen Yards above the Pit) more than 100 Yards. The Barrel of an Horse Engine for winding up the Rope of above 1000 Pound Weight, though fasten'd to the Frame with Locks and Bolts of Iron, together with the Buckets and Rope were thrown up, and carried a good way from the Pit, and Pieces torn off from it scattered about the Woods. And lastly, the whole Frame of the Engine moved out of its Place. The whole Relation deserves well to be read.

THAT which feems to me most strange and Romantick, is the Motion of the Damp, that as if it had been a living thing, it should sty up with a long sharp Flame to lighted Can-

dles

dles set over the Eye of the Pit, and put them out. And yet Mr. Fessop also mentions a like Motion in that of Wingersworth; For if, says he, in the Bink where it was, they beld their Candles any higher than ordinary, they could see the Damp, which lay near the Roof, to descend like a black Mist, and catch hold of the Flame, lengthening it to two or three Handfuls.

By these Descriptions, this Damp should seem to be but Gun-powder in a Vapour, and to partake the Sulphur, Nitre, and Bitumen, as the learned Dr. Plot well proves in his Natural History of Staffordshire, c. 3. sect. 47. to which I referr the Reader. But for the Accension of it, whether it ever takes Fire of itself, I am in some Doubt. Mr. Jessop denies it of those of Hasleberg and Wingersworth; and how far those Relators that affirm it are to be credited, I know not.

IF in this Particular I were fatisfied, I should readily accord with the Doctor, That our Earthquakes in England, and any others that have but one single Pulse, owe there Original to the Kindling and Explosion of Fire-Damps.

You will fay, That Fire is the Cause of Thunder we readily grant, because we see it plentifully discharged out of the Clouds; but what Reason have we to think so of this Sort of Earthquakes, where we see no Lightning or Eruption of Fire at all? What becomes of the inclosed Flame?

In Answer hereto, I demand, What becomes of it in the open Air? It diffuses itfelf through the Caverns of the Earth, till the Deflagration be made, and is there diffipated and dissolved into Fume and Ashes. It breaks not forth, I conceive, because by reason of the Depth of the Caverns wherein it is lodged, it is not able to overcome the Resistance of the incumbent Earth, but is forced quà data porta ruere, to make its Way where it finds easiest Passage through the strait Cuni-culi of the Earth: As in a Gun the inslamed Powder, though if it were at Liberty, and found equal Resistance on every Side, it would spread equally every Way; yet by reason of the Strength and Firmness of the Metal, it cannot tear the Barrel in Pieces, and so break out; but is compelled to fly out at the Muzzle, where it finds an open, tho' strait Pasfage. For the Force of Flame, though very great, is not infinite.

It may be farther objected, We hear not of any Eruption of Fire at Port-Royal, or elfewhere in this Island, and yet the Earth opened, and the Roofs of the Caverns fell in, therefore Fire could not be the Cause of this Earthquake; for if it had, at those Apertures and Rifts of the Ground, it must needs have

issu'd forth and appear'd abroad.

To which I answer, that the Vaults and Cavities wherein the inflamed Matter was imprison'd, and the Explosion made, lay deep

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in the Earth, and were cover'd with a thick and impenetrable Coat of hard Stone, or other folid Matter which the Fire could not tear; but that above this Coat there were other superficial Hollows in a more loose and crumbling Earth, which being not able to sustain the Shock, and hold out against the impetuous Agitations of the Earthquake, the Roofs might yield, open, and subside, as we hear they did, and give Way to the Sea to rush in and surmount them.

You will reply, This may be a tolerable Account of our English Earthquakes, which are finished at one Explosion, but what shall we say to those of Jamaica, which like a Tempest of Thunder and Lightning in the Clouds, have (as we learn by this Relation) several Paroxysms or Explosions, and yet no

Discharging of Fire?

To which I answer, That I conceive the Caverns of the Earth wherein the inflamed Damps are contained, are much larger there than ours in England; and the Force of the Fire, joined with the Elatery of the Air, being exceeding great, may of a sudden heave up the Earth, yet not so far as to rend it in sunder, and make its Way out, but is forced to seek Passage where it finds least Resistance through the lateral Cuniculi. So the main Cavern being in a great Measure emptied, and the Exterior Parts of the extended Matter within cooling and shrinking, the Earth may

may subside again, and reduce the Cavern to its former Dimensions. Yet possibly there may not be a perfect Deslagration and Extinction of the Fire, and so new Damps ascending out of the Earth, and by Degrees silling the Cavern, there may succeed a second Instantion and Explosion, and so a third and fourth till the Steams be quite burnt up and consumed. But in this, I confess, I do not satisfy myself. They who have a more comprehensive Knowledge of all the Phanomena,

may give a better Account.

But as for those Earthquakes that are occasion'd by the Burning of Vulcano's, they are, I conceive, of a different Nature. For in them the Fire burns continually, and is never totally extinct, only after the great Eruptions, in which, besides Smoak and Fire, there is an Ejection of abundance of Ashes, Sand, Earth, Stones, and in some Floods of melted Materials, the Raging is for a time qualified; but the Fire still continuing, and by Degrees increasing in the combustible Matter it finds in the Hollows of the Mountains, at last swells to that Excess, that it melts down Metals and Minerals where it meets with them, causing them to boil with great Fury, and extending itself beyond the Dimensions of the Cavities wherein it is contained, causes great Succussions and Trem-blings of the Earth, and huge Eruptions of Smoak, and casts out such Quantities of Ashes.

Ashres, Sand, and Stones, as we just now mention'd; and after much Thunder and Roaring by the Allision and Repercussion of the Flame against and from the Sides of the Caverns, and the Ebullition and Volutation of the melted Materials, it forces out that boiling Matter either at the old Mouths, or at new ones, which it opens where the incumbent Earth is more thin and yielding. And if any Water enters those Caverns, it mightily encreaseth the Raging of the Mountain. For the Fire suddenly dissolving the Water into Vapour, expands it to a vast Dimension. and by the Help thereof throws up Earth Sand, Stones, and whatever it meets with. How great the Force of Water converted into Vapour is, I have sometimes experimented by inadvertently casting a Bullet in a wer Mold, the melted Lead being no sooner poured in, but it was cast out again with Violence by the Particles of Water adhering to the Mold, suddenly converted into Vapour by the Heat of the Metal.

Secondly, The People of this Plantation being generally so ungodly and debauched in their Lives, this Earthquake may well be esteemed by this Gentleman, the Minister of Port-Royal, a Judgment of God upon

them.

For tho' it may be a fenile Complaint, and popular Mistake, that the former Times were better than these, and that the World doth

doth daily degenerate, and grow worse and worse. Ætas parentum pejor avis tulit hos nequiores, mox daturos Progeniem vitiosiorem. For had this been true, Vice would long before this Time have come to the Height and greatest possible Excess; and this Complaint hath been made as well in the best as worst of Times. Though, I say, this be partly an Error, yet I do verily believe, that there are certain Times when Iniquity doth abound, and Wickedness overflow in a Nation or City; and that long Peace and Prosperity, and great Riches, are apt to create Pride and Luxury, and introduce a general Corruption of Manners: And that at fuch Times God ufually fends fome fweeping Judgment, either utterly destroying such a People who have filled up the Measure of their Iniquity, or at least grievously afflicts and diminishes them. So when in the old World the Wickedness of Man was great upon the Earth, and every Imagination of the Thoughts of his Heart was only Evil continually, Gen. vi. 5. And the Earth was corrupt before God, and filled with Violence, all Flesh having corrupted their Ways, vers. 11, and 12. God brought in the Flood, and drowned them all. The like Vengeance we find executed on the Cities of Sodom and Gomorrha, after such a monstrous Height of Wickedness as the Inhabitants were generally arrived at. And we shall find it noted by Historians, That before any great publick

publick Calamity, or utter Excision of a Nation, the People were become univerfally vicious and corrupt in their Manners, and without all Fear of God, or Sense of Goodness. For God doth not stand by as an idle and unconcerned Spectator, and fuffer Things to run at Random, but his Providence many times interposes, and stops the usual Course and Current of Natural Causes: Nay, I believe and affirm, That in all great and notable Revolutions and Mutations, He hath the greatest Hand and Interest; Himself ordering and governing them by His special Super-intendence and Influence. So, though the Instruments and Materials wherewith this Devastation in Jamaica was made, as a subterraneous Fire and inflamable Materials, were before in the Earth, yet that they should at this time break forth and work, when there was fuch an Inundation of Wickedness there, and particularly and especially at Port-Royal, this we may confidently say, was the Finger of GoD, and effected perchance by the Ministery of an Angel.

Moreover, this Relator's being called a-fide, and stopped from going to a Place, whither if he had then gone he had certainly perished, we have good Reason to think an Effect of Providence, designing thereby his Preservation; as Gregory the Bishop of Antioch his going out of the House wherein he abode immediately before it fell down,

was rationally thought to be in respect of him.

Bur to proceed; I should now have done concerning Earthquakes, it being my design only to take notice of fuch as have made considerable Mutations in the superficial Part of the Earth, passing by those, which after a short Trembling and Succussion, have left the Earth as they found it, making no Alteration at all therein. But at the very time this Sheet of Earthquakes was Composing, there happening a notable one, though of this latter Kind, in our own Country; I was, partly by the Coincidence of it with the Compofure before-mentioned, partly at the Request of the Bookseller, induced to make some Mention of it, and add what I knew or could learn of its History; which is, indeed, very little and inconfiderable, we having as yet but a very lame and imperfect Account of the Accidents of it.

As for the Time when it happened, it was the 8th of September, 1692. about 4 Minutes past Two of the Clock in the Afternoon, as was observed at London: Hereabouts I can hear of no body that was so critical in noting the Time, only they agree that it was about Two of the Clock. Had we a punctual and exact Notice of the very Minute that it happened in far distant Places, we might thence gather something concerning the Motion and Progress of it. However, it is remarkable.

markable, that it happened in the Autumn, one of the Seasons, in which, Aristotle tells us, fuch Effects are most frequent, the other being the Spring; and likewise in the Month of September; in the which, that about Oxford in the Year 1683. fell out; and, moreover, in a wet Season, as that also did: Though the Forenoon of the Day was clear and fair, yet, in the Afternoon, when the Earthquake was past, it rained hard till Night; the whole precedent Summer (to this I mean) having been cold and wet: Which, what Influence it can have toward the Production of an Earthquake, unless by stopping the Pores of the Earth, and hindring the Evaporation of those sulphureous Steams, which are the Efficients of it, I know not. The same Night fucceeded some Strokes of Thunder and Flashes of Lightning, both here and at London; and fince then, we have had great Storms of Wind. I might have taken Notice, that, for some Mornings before, we had smart Frosts for the time of the Year.

SINCE this was written, and sent away in order to printing, I am advis'd, by Letter from my honoured Friend Dr. Tancred Robinson, that this Earthquake was not confin'd to some Counties of England, as Middlesen, Essen, Kent, Sussen, Hampshire, &c. but spread far into Foreign Parts; an Account whereof I shall give you in the Doctor's own Words. The Concustion or Vibration of our late Earth-

quake was felt in most Parts of the Dutch and Spanish Netherlands, as also in Germany and France: It affected Places most upon the Sea-Coasts, and near the great Rivers, as Zealand. Cologn, Mentz, and the Bridge of London. It went not beyond 52 Degrees and 40 Minutes of Northern Latitude; how far it reach'd to the South and East, is not yet certainly known, for Want of good Intelligence; we have already traced it beyond Paris, to the 48 Degree of N. Latitude, and beyond the Rhine, on the East to Francfort; so that we know, at present, of 260 Miles square shaken by it. The Motions of some Machines were very senfibly stop'd or retarded by the Choc, especially Pendulums: And there were some Alterations in the Air, (as to its Smell, Spring, and Gra-vity) both before and after. The Time of its happening here in England, and beyond the Seas, seems to vary some Minutes; but that may easily be accounted for by the Difference of Meridians. Thus far the Doctor. Dat. Septemb. 22.

THE Duration or Continuance of it (as I am informed by some curious and attentive Observers) about London, was about two

Minutes; here not fo long.

THE Manner of the Motion, as I am affured by my learned and ingenious Friend and Neighbour Mr. Allen, Physician in Braintree, who had it from several intelligent and observant Persons hereabouts, and that lived

in distant Places, was first a manifest Heaving upwards, and after that a Trembling, or Vibration, or Agitation to and fro. So that in the first respect, its Motion seemed to resemble that of the Blood in an Artery, stretching the Channel as it passed.

THE Motion of it was most considerable

upon the Hills, and in Valleys.

The Effect it had upon those who were sensible of it, was a Swimming or Dizziness in their Heads; and this was general upon all. In some it affected their Stomachs, and created a Loathing, and Inclination to Vomit: Some of the tenderer Sex sound in themselves such a Disposition as they have had before a swooning Fitt. All which must be the Effects, either of the Heaving, or tremulous Motion, or both; and yet, no Motion of Boat or Coach doth so suddenly affect and disturb the Head or Stomach.

Lastly, It was attended with a Noise, as our Earthquakes generally in England are, as is observed by Mr. Pigot in that of Oxford in the Year 1683. and by myself when I lived in Sutton-Cosseld, in one that happen'd there in the Winter-time, as I remember, in the Year 1677. and extended at least 40 Miles in Length into Worcestershire. The Noise I heard, seem'd to be in the Air. This Noise, hereabouts, was heard but in few Places, and by few Persons; but yet I am well assured by some, and those of the Vulgar and Ignorant

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fort, who reported it of themselves, having no reason to seign it, and who had never heard that any such thing accompanied

Earthquakes:

FROM many of the afore-mentioned Particulars, it may be collected, That the Caverns, in which the inflamed Damp, causing this Earthquake, was contained, lie deep in the Earth.

For, 1. It could not else have shook such a vast Extent of Ground, both Hills and Valleys in England, and beyond Seas, (the Motion not being stopt by the Channels of great Rivers or even Greeks of the Sea) unless, I say, the containing Cuniculi or Conduits had passed under the very Bottom of the narrow Seas: Which is a great Confirmation of what we have before delivered concerning the Mountains of Ætna, Stromboli, and Vesuvius, communicating by submarine Vaults.

2. If the Caverns had not lain deep, the enclosed Damp would, in all likelihood, somewhere or other, have rent the superincumbent Earth, and broken forth in the

Form of a Flame.

AND yet, notwithstanding the Depth, it should seem, it sound so much Vent as to affect the external Air, and create a Sound: For if the Caverns, wherein the Damp was, had been close shut up with such a thick Coat of Earth, I doubt whether the Trembling

bling and Vibration of the foft Earth alone, would have produced such a Noise abroad in the Air; and the Vapour of it also made a shift to struggle through the Pores of the Earth into the open Air, in such Quantity as to affect the Sense; a sulphurous Scent having been observed in the Air, both before and after the Concussion.

Ir is, moreover, very remarkable, That there were some particular Spots which were not at all stirred in those Countries where the Places, not far distant round about, were shaken; as Sturbridge-Fair before-remembred, and that where my Dwelling is; neither myself, nor any of my Family, though they were Above-stairs, nor any of our near Neighbours, being sensible of the least Motion or Impression of it, and yet those living within less than half a Mile, had their Houses considerably shaken by it.

It is also worth the noting, That both this, and all other Earthquakes I have heard or read of in England, have been very short, and finished at one Explosion; which is an Argument that the Cavities and Cuniculi, wherein the instamed Matter is contained and moves, are very strait, and of small Dimensions. Explosion I call it, because by the Quickness of the Motion, it seems rather to resemble that of Powder in a Gun, than that of a Squib running in a Train of Powder. Though others I have read of, whose Motion

was very flow; as that observed by the Honourable Mr. Boyle, and described in the Philosophical Transactions, Numb. 11. Had we
certain Knowledge where the greatest Force
of this Earthquake was, we might thence
learn where its first Accension was, and
which way it spread itself. But I have not
time to enlarge farther concerning it, or to
give an Account of all its Phanomena, lest I
injure the Printer by stopping the Press:
Neither, indeed, would it be Prudence to attempt it, till we have a more particular and

perfect History of it.

· SINCE this was written and fent away to the Printer, Intelligence is come from beyond the Seas, that Flanders, and all Holland, Part of France and Germany, were shaken by this Earthquake, and, consequently, the interjacent Provinces; which is a clear Demonstration of our Opinion, That the inflamed Damp, which caused it, was lodged deep in the Earth, the Cuniculi or Caverns, which contained it, passing under the very Bottom of the Sea. It is also a great Confirmation of what we have delivered concerning the Mountains of Atna, Stromboli, and Vesuvius, communicating by submarine Passages. Add hereto, that Gassendus, in the Life of Peireskius, reports, That at the Mountain Semo in Æthiopia, there happened a Burning at the same time with that of Vesuvius in Campania, viz. in the Year

1633. So that not only Vesuvius communicates with Ætna by subterraneous Vaults, but also (as he rationally inferrs) Ætna with the Mountains of Syria, the Tunnels running under the Depths of the Mediterranean Sea, and those with the Arabian; and, lastly, the Arabian with Mount Semo in Æthia-

pia.

THAT an inflamed Damp or fubterraneous Fire is the Cause of all Earthquakes in general, and not only such as precede the Eruptions of *Vulcano's*, may be proved by an eminent Instance of an Earthquake happening May 12. 1682. which shook the greatest Part of France and Switzerland, and reach'd as far as Collen in Germany: An Account whereof we have in the Journal des Scavans, set forth June 1. 1681. inserted in the Weekly Memorials printed for Mr. Faithorne Numb. 23. In which they write, That it was perceived in Lionnois, (which was wont to pass for a Place exempt from such Accidents) in Dauphiny and Beaujolois, though very little, and without any ill Consequence. That at Mets in Lorrain, the Watch-place of a Bulwark was thrown down into the Ditch, with the Soldier that stood Centinel there.

THAT at Tonnerre, the Houses and Churches were so terribly shaken, as if several Coaches with fix Horses had driven along full speed through the Streets; and that it threw down feveral Rocks on the fide of Bourbirant. They tell also, that it stopt a Fountain at Raviere, hard by, (which at fifty Paces from its Head, turns a Mill) for half an Hour.

That it was perceived in *Provence*, by the Shaking of Windows and Beds, and Opening of Doors; and that it had two feveral Motions or Pulfes, as ours also was, by some, observed to have: And that the Domestick Animals, as Sheep, Cows, Horses, and Poultry, did discover their Fear by unusual Motions and Cries. And the Sheep at Dison in Burgundy, could not be stop'd from getting into their Stalls at Four of the Clock in the Afternoon, which were not then wont to betake themselves thither till Sun-set.

THAT the Cities of Orleans, Troyes, Sens, Chalons, Joinville, Reims, Soissons, Laon, Mascon, Dole, Strasbourg, Gc. felt the Ef-

fects of it.

But at Remirement upon the Moselle, where it exerted its greatest Force, throwing down several Houses, insomuch that the Inhabitants were forced to betake themselves into the Fields for six Weeks time; there was a Noise heard like Thunder, and Flames frequently broke out of the Earth of a noisome Scent, but not sulphureous, and which burnt nothing; yet was there no Rist or Chap in the Ground, save only in one Place; the Depth whereof was in vain search'd,

fearch'd, and which afterwards closed up. And before this Earthquake also, Flames appeared for four Days upon a Mountain near Geneva.

IT is very strange and remarkable, that the Flames that issued out, were of the Nature of an Ignis fatuus, and burnt nothing; and that the Earthquake raged every Night, and never in the Day-time.

Concerning Earthquakes, I shall only add

two Observations.

1. That it is not likely that they spendall their Strength upon Cities, but do indifferent-ly shake, break in sunder, and throw down Mountains and Rocks; and seeing few Cities there are but have been shaken, and many ruined and subverted by them, and leveled with the Ground; there is good Reason to think, that few Rocks or Mountains have escaped their Fury, but have suffered the like Concussions and Alterations.

2. THAT the Changes that have hitherto happened in the Earth by Earthquakes, have not been so considerable as to threaten a Disfolution of the prefent System of the Terraqueous Globe, should there be a like Succession of them to Eternity. Unless we will except that unparallel'd univerfal One, which happened in the Days of Valentinian the First, (which we have already mentioned) by which the whole known World, both Land and Sea, and it's like the then unknown too, were

violently

violently shaken; which might seem to be a Prelude to the suture Conslagration, or Destruction of the whole, by such a Consusion and Dashing in Pieces of all the Parts of it, one against another, as the Stoicks speak of.

Or the Effects of burning Mountains or Vulcano's, I have already faid fomething, and shall, afterwards, have occasion to say more. In brief, 1. They cast forth out of their Mouths, and fcatter all over the Country, sometimes to a very great Distance, abundance of Sand and Ashes. Dion Cassius reports, That in the noted Deflagration of Vesuvius, in the Time of Titus the Emperor, there was fo much Cinders and Ashes vomited out of its flaming Tunnel, and with that Fury and Violence, that they were transported over Sea, into Africa, Syria, and Egypt; and, on the other fide, were carried as far as Rome, where they darkned the very Air, and intercepted the Sun-beams. At which time, by the Fury of this Burning and Tempest, the whole Mountain and Earth thereabouts was so shaken, that two adjoining Cities, Herculanium and Pompeii, were destroyed with the People sitting in the Theater. And the famous Natural Historian Pliny the Elder, then Admiral of the Roman Navy, out of a Curiosity of searching out the Causes and Nature of the Deflagration, approaching too near the Mountain, and staying too long

there, was fuffocated with the fulphureous Smoke and Stench thereof.

Or another Eruption of the same Vesuvius, we read, in the Time of Leo the Emperor, wherein the Ashes thereof, transported in the Air, obscured all Europe, being carried as far as Constantinople; and that the Constantinopolitans being wonderfully affrighted therewith, (insomuch as the Emperor forsook the City) in memory of the same did yearly celebrate the Twelsth of November.

2. They also pour out huge Floods of melted Minerals, Stones, and other Materials, running down like Rivers for many Miles together; as did the Mountain Ætna in that last and most famous Eruction, disgorging such mighty Streams of fiery running Matter, as slowed down to Catana, above twenty Miles distant, and advanced a considerable way into the very Sea itself.

2. THE next thing I shall mention, is the extraordinary Floods caused by long continuing Showers, or violent and tempe-

stuous Storms and Shots of Rain.

THE most ancient and memorable of this Kind is that of Deucalion, of which we have already discoursed sufficiently. S. Hierome, in the Life of Hilarion, (as I find him quoted by Dr. Hakewill) speaks of a Flood and Inundation after the Death of Julian, in which Naves ad prarupta montium delata pependerunt, the Ships being landed upon the

which, whether it proceeded from Rain, or from an Irruption of the Sea, or from both Causes together, he doth not say: But if it were literally true, and not hyperbolically exaggerated, then may some Credit be given to what Sabin, in his Commentaries upon Ovid's Metamorphosis, reports, Ex Annalium monumentis constat Anno 1460. in Alpibus inventam esse Navim cum anchoris in cuniculo per quem metalla essodiuntur: It appears by by the Monuments of History, that in the Year 1460. in a Mine of the Alps, was sound a Ship with its Anchors; in Consirmation of what that Poet writes:

Et vetus inventa est in montibus anchora summis.

In the Year of our Redemption 590. in the Month of October, Gregory being then Bishop of Rome, there happened a marvellous Overslowing in Italy, and especially in the Venetian Territory, and in Liguria, accompanied with a most fearful Storm of Thunder and Lightning; after which followed the great Plague at Rome, by reason of many dead Serpents cast up, and left upon the Land, after the Waters decreased and returned.

STROZIUS SIGOG, in his Magia omnifaria, telleth of an Inundation in Italy, in the Time of Pope Damasus, in which also many

Cities

Cities of Sicily were swallowed: Another in the Time of Alexander the Sixth. Also, in the Year 1515. Maximilian being Emperor, he also remembers a perilous Overslowing in Polonia about Cracovia, by which many

People perished.

LIKEWISE Vignier, a French Historian, speaketh of a great Flood in the South Part of Languedoc, which fell in the Year of our Lord 1557. with fo dreadful a Tempest, that all the People attended therein the very End of the World and Judgment-Day, faying, That by the violent Descent of the Waters about Nismes, there were removed diversold Heaps and Mountures of Ground, and many other Places torn up and rent; by which Accident, there was found both Coin of Silver and Gold, and divers Pieces of Plate, and Vessels of other Metal, supposed to be hid-den at such time as the Goths invaded that Province. These Stories related in the three last Paragraphs, I have borrowed of Sir Walter Raleigh his History of the World.

To which I shall add one of late Date happening in Sicily, a Narrative whereof communicated in a Letter from Palermo, dated June the 25th, 1682. I met with in the London Gazette, Numb. 1742. in the following Words: We have an Account from the Town of Tortorica, That on the Sixth Instant, about Seven a Clock in the Evening, after so great a Darkness that no Object could

be distinguished at the Distance of four Paz ves, there arose such a great Storm of Rain, Lightning, and Thunder, which lasted Six and thirty Hours, that about One a Clock the next Morning, great Torrents of Water caused by these Rains, fell down from the neighbouring Mountains with so great Rapidity that they carried with them Trees of an extraordinary Bigness, which threw down the Walls and Houses of the Town they happened to beat against. The Waters were so violent that they overthrew the Church of S. Nicholas; and the Arch-Deacon of the Town, who retired thither, perished there with many other Persons: There remaining only one Abby, and about fifty Houses, and those so shattered, that they fell one after another. There were about Six hundred of the Inhabitants drown'd, the rest being abroad in the Field gathering their Silk, fled to the Mountains, where they suffered very much for Want of Provisions. The Goods, Trees, Stone, Sand, and other Rubbish, which the Waters carried away, were in so great Abundance, that they made a Bank above the Water, two Miles in Length, near the Mouth of the River, where, before, the Sea was very deep. This Town is situate in that Part of Sicily called the Valley of Demona, on the side of the River Tortorica, about Five and twenty Miles from the Tuscan Sea. The Towns of Randazzo and Francaville,

and.

and several others, have likewise been destroyed by this great Flood. It is added, that Mount Ætna casts out such abundance of Water, that all the neighbouring Country is drowned. Which if it be true, (as I see no Reason to doubt it) this is a farther Proof against Borellius, that the Caverns of Ætna are more than superficial, and reach down to the very Roots and Foundations of that Mountain, communicating with the subterraneous Abyss, and the Sea itself, from whence, in all likelihood, these Waters were derived, as is evident in those poured out by Vesuvius.

MANY other Floods we read of in Histories, whether caused by Rains or Inundations of the Sea, is uncertain; and, therefore, I shall not spend time in setting them down. The Effect of all which, relating to the Earth in general, is, the Wasting and Washing away of Mountains and high Grounds, the Raising of the Valleys and Bottoms, and, confequently, Leveling of the Earth, and Land-

ing up of the Sea.

3. THE last thing I shall mention, which hath effected considerable Changes in the Earth, is boisterous and outrageous Winds and Hurricanes, of which I need not give Instances, they every Year almost happening. These, I conceive, have a great Interest in the Inundations of the Sea we have before mentioned. These raise up those great Hills or

Downs

Downs of Sand we see all along the Coasts of the Low-Countreys, and the Western-Shores of England, and the like Places. These sometimes blow up so much Sand, and drive it so far as to cover the adjacent Countrys, and to mar whole Fields, yea, to bury Towns and Villages. They are also a concurrent Cause of those huge Banks and Shelves of Sand, that are so dangerous to Mariners, and bar up Havens, and ruin Port-Towns; of

which many Instances might be given.

I FIND in Dr. Hakewill's Apology, a Story or two, shewing the great Force and Strength of Winds; the one taken out of Bellarmine's Book, De ascensu mentis in Deum per scal. creat. grad. 2. Vidi ego (saith the Cardinal) quod nisi vidissem non crederem, à vehementissimo vento effossam ingentem terra molem, eamque delatam super pagum quendam ut sovea altissima conspiceretur, unde terra eruta suerat; & pagus totus coopertus, & quasi sepultus manserit, ad quem terra illa devenerat: i. e. I myself have seen, which if I had not seen, I should not have believed, a very great Quantity of Earth, digged out and taken up by the Force of a strong Wind, and carried up a Village thereby, so that there remained to be seen a great empty Hollowness in the Place from whence it was lifted, and the Village upon which it lighted was in a manner all covered over and buried in it.

The other out of Stow, who reports, That in the Year 1095. during the Reign of King William Rufus, there happened in London an outrageous Wind, which bore down in that City alone Six hundred Houses, and blew off the Roof of Bow-Church, with which the Beams were borne into the Air a great Height, six whereof being 27 Footlong, with their Fall were driven 23 Foot deep into the Ground, the Streets of the City lying then

unpaved.

Now then to fum up what we have faid; The Changes and Alterations that have been made in the superficial Part of the terraqueous Globe, have been effected chiefly by Water, Fire, and Wind. Those by Water have been either by the Motions of the Sea; or by Rains; and both either ordinary or extraordinary: The ordinary Tides and Spring-Tides of the Sea do wash away the Shores; and change Sand-Banks, and the like. The extraordinary and tempestuous Motions of the Sea, raised by raging and imperuous Winds, subterraneous Fires, or some other hidden Causes, overwhelm Islands, open Fretums, throw up huge Beds and Banks of Sand, nay, vast Baiches of Stone, extending fome Miles, and drown whole Countrys. The ordinary Rains contribute something to the daily Diminution of the Mountains, filling up of the Valleys; and atterrating the Skirts of the Seas. The extraordinary Rains causing

causing great Floods and Deluges, have more visible and remarkable Influences upon such Mutations, doing that in a few Days which the ordinary Weather could not effect, it may be, in a hundred Years.

In all these Changes the Winds have a great Interest; the Motion of the Clouds being wholly owing to them, and, in a great measure also, the Overslowings and Inunda-

tions of the Sea.

WHATEVER Changes have been wrought by Earthquakes, Thunders, and Eruptions of

Vulcano's, are the Effects of Fire.

All these Causes co-operate toward the lowering of the Mountains, leveling of the Earth, straitning and landing up of the Sea, and, in fine, compelling the Waters to return upon the dry Land, and cover the whole Surface of it, as at the first. How to obviate this in a natural way, I know not, unless by a Transmutation of the two Elements of Water and Earth one into another, which I can by no means grant. 'Tis true indeed, the rocky Parts of the Mountains may be fo hard and impenetrable, as to refist and hold out against all the Assaults of the Water, and utmost Rage of the Sea; but then all the Earth and Sand being washed from them, nothing, but as it were their Skeletons, will remain extant above the Waters, and the Earth he in effect drowned.

Bur tho' I cannot imagine or think upon any natural Means to prevent and put a Stop to this Effect, yet I do not deny that there may be some; and I am the rather inclinable fo to think, because the World doth not in any Degree proceed so fast towards this Period, as the Force and Agency of all these Causes together seem to require. For, as I said before, the Oracle predicting the Carrying on the Shore of Cilicia as far as Cyprus, by the Earth and Mud that the turbid River Pyramus should bring down, and let fall in the interjacent Strait, is so far from being filled up, that there hath not any confiderable Progress been made towards it, so far as I have heard or read, in these 2000 Years. And we find by Experience, that the longer the World lasts, the fewer Concussions and Mutations are made in the upper or superficial Region of the Earth; the Parts thereof seeming to tend to a greater Quiet and Settlement.

In this Conjecture I find myself mistaken. For since the Writing hereof there have happened as terrible and destructive Earthquakes as any we read of in History, particularly those of Sicily in the Year 1692-3. the first on Jan. 9. about four Hours and a half after Sun-set; the second on the 11th of the same Month, about the 21st Hour of the Day, according to the Italian Reckoning, that is, three Hours before Sun-set. In both which

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there

there perished 93000 Souls; were destroyed and much damnified 2 Bishopricks, 700 Churches, of which 22 Collegiate ones, 250 Monasteries, 49 Cities and Villages, whereof the most remarkable was the City of Catania, one of the fairest and largest in the Island, which was wholly overthrown and buried in its Ruins, scarce any Footstep of it remaining, wherein perished above 15000 Souls: Of which the learned and ingenious Signor Paulo Bonone gives a particular Account, in his Book entituled, Musaum Physicum & Experimentale; and besides affords us many curious Remarks and Observations, concerning the Signs, Concomitants and Effects of these Earthquakes, which being too long to transcribe, it not being my Design to write a complete Treatise of Earthquakes, but only to discourse a little of them occa-fionally, as they, or rather the Cause of them, might possibly have been the Means or Instruments the Almighty made use of at first to raise up the dry Land, and cast off the Waters; I referr the Reader to the Book itfelf.

2. THOSE of Naples, or Terra di Lavoro, anciently called Campania Felix, happening on the fifth of June 1688. of which Mr. Misson gives us an Account at the End of his New Voyage to Italy, Vol. 1. sent in a Letter from an English Merchant then living

in

in Naples to his Friend, in these Words: Sir. About eight Days ago we all believed the World was at an End. We felt a most terrible Earth. quake in this Town of Naples: It lasted but three Minutes, but in that little time such Things happened, as without all Doubt were done by the Hand of the Almighty. About a quarter of an Hour after four in the Afternoon, a terrible Earthquake shook the whole City all of a sudden, and put the People into such a Confusion as cannot be expressed. Mount Vesuvius being quiet, no Body mistrusted any such Thing: And though they perceived the Houses to stoop, and to recover again, to part from one another, to move every where, and in some Places to fall, their Astonishment was so great, and their Eyes so dazzled, that some cried out Fire, others fancied to themselves Some popular Sedition, and very few guessed what it really was. But another more violent Earthquake succeeding the first, a subterraneous Noise, surpassing that of Thunder, was heard and accompanied by a Domestick Noise of all the Houshold Goods, which were overturned, and a good Part of them either broken or bruised. The Bells rang in all the Steeples, the Cisterns vomited up their Waters, several Houses parted from each other, some rejoined, others fell, and some stood as if they were stooping and ready to fall. Then every one was sensible that it was an Earth- $U_3$ quake,

quake, &c. To this succeeded a third Trembling, which the Writer only mentions. Not many People were lost in this Earthquake at Naples; but the Damage sustained by it was reckoned by knowing Persons to amount to Ten Millions of Crowns. At the Town of Benevento there were 1567 Persons crushed to Pieces, and buried under Ruins; so that that Town is nothing now but a Heap of Stones. We have here a List of 800 Persons more killed in twelve or thirteen Villages about the faid City of Benevent. The Town of Ceretto, belonging to the Duke of Mattalone, was entirely overturned, and 4000 Persons perished therein. Five Hundred were also lost at Mirabella, 1000 at S. Lupo, 300 at S. Lawrence Major, 400 at Pierra Roya, and every Soul, without any ones escaping, at the Boroughs of Civitella, S. Lawrence Minor, and Guardia S. Framondi.

3. To these may be added the terrible Earthquake in the Island of Jamaica, where-of we have already discoursed at large.

BESIDES, the Superficies of the Sea, not-withstanding the Overwhelming and Sub-mersion of Islands, and the Straitning of it about the Outlets of Rivers, and the Earth it washes from the Shores subsiding, and elevating the Bottom, seems not to be raised higher, nor spread farther, or bear any greater Proportion to that of the

the Land than it did a Thousand Years

ago.

So have I finished my second Discourse concerning the Deluge and its Effects; and the Mutations that have been since made in the Earth, and their Causes.



DIS-



### DISCOURSE III.

OFTHE

# DISSOLUTION

OFTHE

## WORLD.

THE

## INTRODUCTION

TO THE

## Third Discourse.



HERE is implanted in the Nature of Man a great Defire and Curiofity of fore-knowing future Events, and what shall befall themselves, their

Relations and Dependents in time to come; the Fates of Kingdoms and Commonwealths, especially especially the Periodical Mutations, and final Catastrophe of the World. Hence, in ancient Times, Divination was made a Science or Mystery, and many Nations had their Colleges or Societies of Wise-Men, Magicians, Astrologers and Sooth-sayers; as for Example, the Egyptians, Babylonians and Romans. Hence the Vulgar are very prone to consult Diviners and Fortune-Tellers.

To gratify in some Measure this Curiosity, and that his People might not in any Privilege be inferiour to the Nations about them, it pleased God, besides the standing Oracle of Urim, not only upon special Occasions to raise up among the Jews extraordinary Prophets, by immediate Mission; but also to settle a constant Order and Succession of them, for the Maintenance and Upholding whereof, there were Colleges and Seminaries instituted for the educating and sitting young Men for the Prophetick Function. These were the Sons of the Prophets, of whom we find so frequent Mention in Scripture.

Moreover, it pleased God so far to condescend to the Weakness of the Jews, that in the Infancy of their State, He permitted them to consult His Prophets concerning ordinary Accidents of Life, and Affairs of small Moment: As we see Saul did Samuel about the Loss of his Father's Asses, which it's not likely he would have done, had it not been u-

fual

\* Hore Hebr. in Matth.

fual and customary so to do. In the latter Times of that State, we read of no Consulting of Prophets upon such Occasions. At last also by their own Confession, the Spirit of Prophecy was quite taken away, and nothing left them but a Vocal Oracle, which they called Bath col, i.e. the Daughter of a Voice, or the Daughter of Thunder, a Voice out of a Voice. This Dr. \* Lightfoot thinks to have been a meer Fancy or Imposture. Qua de Maub. esp. 3. v. Bath Kol referent Judæi, ignoscant illi mihi 17. fi ego partim pro Fabulis habeam Judaicis, partim pro prastigiis Diabolicis. What the Jews report concerning Bath Kol, I beg their Pardon, if I esteem them no other than either Jewish Fables, or Diabolical Illusions. It is a Tradition among them, that after the Death of the last Prophets, Haggai, Zachary, and Malachi, the Holy Spirit departed from Israel. But why, I befeech you, was Prophecy withdrawn, if Celestial Oracles were to be continued? Why was Urim and Thummim taken away, or rather not restored, by their own Confession, after the Babylonish Captivity? It were strange indeed, that God taking away His ordinary Oracles from a People, should bestow upon them one more or equally noble; and that, after they were extremely degenerated and fallen into all manner of Impiety, Superstition and Herefy, Gc. And a little after, if I may freeby speak what I think, those innumerable Stories,

Stories, which every where occurr [in the Jewish Writings] concerning Bath Kol, are to be reduced to two Heads, viz. 1. The most of them are meer Fables, invented in Honour of this or that Rabbin, or to gain Credit to some History. 2. The rest meer

Magical and Diabolical Illusions, &c.

In the Primitive Churches of Christians planted by the Apostles, there was also an Order of Prophets, 1 Cor. xii. 28. God hath set some in the Church, first Apostles, secondarily Prophets, &c. This Spirit of Prophecy was an extraordinary and temporary Gift, as were the Gifts of Healing and Speaking with Tongues, continuing not long after the Death of the Apostles, and Consignation of the Canon of Scripture. So that now we have no Means left us of Coming to the Knowledge of future Events, but the Prophecies contained in the Writings of the Ho-ly Penmen of Scripture, which we must search diligently, consider attentively, and compare together, if we desire to understand any thing of what shall befall the Christian Church or State in Time to come.

THIS Text which I have made Choice of for my Subject, is Part of a Prophecy concerning the greatest of all Events, the Disso-

lution of the World.



MARCHARTAR CONTRACTOR 
#### 2 PETER iii. II.

Seeing then all these Things
shall be dissolved, what manner of Persons ought we to
be in all holy Conversation
and Godliness?

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#### С н а р. Я І.

The Division of the Words and Doctrine contained in them, with the Heads of the following Discourse.

T two Parts: 1. An Antecedent, or Doctrine, All these things shall be dissolved. 2. A Consequent, or Inference thereupon, What

manner of Persons ought we to be?

THE Doctrine, here only briefly hinted, or summarily proposed, is laid down more fully in the precedent Verse; But the Day of the Lord will come as a Thief in the Night, in which the Heavens shall pass away with a

great

great Noise, and the Elements shall melt with fervent Heat, the Earth also, and the Works

that are therein shall be burnt up.

THESE Words are, by the Generality of Interpreters, Ancient and Modern, understood of the final Destruction or Dissolution of Heaven and Earth; in which Sense I shall choose rather to accept them at present, than with the Reverend and Learned Dr. Hammond, and some few others, to stem the Tide of Expositors, and apply them to the Destruction of Jeru alem and the Jewish Polity. I say then,

That this World, and all things therein Doar. contained, shall one Day be dissolved and destroyed by Fire.

By World, in this Proposition, We, and by Heaven and Earth in this Place, the most rational Interpreters of Scripture, do understand only the whole Compages of this Sublunary World, and all the Creatures that are in it; all that was destroyed by the Flood in the Days of Noah, and is now secured from perishing so again; that I may borrow Dr. Hammond's Words, in his Annotations on this Place. 'And again, the Word Heavens' (saith he) being an Equivocal Word, is used either for the superiour Heavens, whether Empyreal or Ethereal, or for the sublunary Heavens, the Air, (as the Word World is either the whole Compages of the superiour and

\* and inferiour World, as the Author of the Book De Mundo, ascribed falsly to Aristotle, defines Κόσμος, σύςημα εξ δυρανε μαὶ γῆς μαὶ τῶν εν τέτοις περιεχομένων Φύσεων, The Syfem or Compages of Heaven and Earth, and the Beings therein contained: Or else only of the sublunary Lower World) we may here resolve, that the Όυρανοὶ and ξοιχεῖα, Heaven and Host, or Elements thereof, are literally the sublunary Aereal Heavens, and all that is therein, Clouds and Meteors, &c. Fowls and slying Creatures, and so, sit to join with the Earth and Works that are therein.

IN Profecution of this Proposition, and in Order to the Proof and Confirmation, and likewise the Clearing and Illustration of it, I shall, (1.) Give you what I find concerning the Dissolution of the World: 1. In the Holy Scripture. 2. In ancient Christian Writers. 3. In the Heathen Philosophers and Sages. (2.) I shall endeavour to give some Answer to these seven Questions, which are obvious and usually made concerning it.

1. WHETHER there be any thing in Nature, which might prove and demonstrate, or argue and inferr a future Dissolution of the

World?

2. WHETHER shall this Dissolution be brought about and effected by Natural, or by extraordinary Means and Instruments;

and what those Means and Instruments shall be ?

3. WHETHER shall the Dissolution be gradual or sudden?

4. WHETHER shall there be any Signs

and Fore-Runners of it?

5. AT what Period of Time shall the

World be dissolved?

6. How far shall this Conflagration extend? Whether to the Ethereal Heavens, and all the Host of them, Sun, Moon, and Stars, or to the Aereal only.

7. WHETHER shall the Heavens and Earth be wholly dissipated and destroyed, or

only refined and purified?

#### CHAP. II.

The Testimonies of Scripture concerning the Dissolution of the World.

HEN, let us consider what we find delivered in the Holy Scriptures, concerning the Dissolution of the World. And first of all, This Place, which I have made Choice of for my Text, is in my Opinion the most clear and full, as to this Particular, in the whole Scripture; and will give Light for the Solution of most of the proposed

posed Questions. Vers. 10. The Day of the LORD Shall come as a Thief, &c. This an-fwers the third Question, Whether the Disfolution shall be gradual or sudden? Wherein the Heavens shall pass away with a great Noise, and the Elements shall melt with fervent Heat, the Earth also, and all the Works that are therein, shall be burnt up. And again, Ver. 12. Wherein the Heavens being on Fire shall be dissolved, and the Elements shall melt with fervent Heat. This answers the second Question, What the Means and Instruments of this Dissolution shall be? Ver. 13. Nevertheless we, according to his Promise, look for a new Heaven and a new Earth, wherein dwelleth Righteousness. This gives some Light toward the answering of the last Question, Whether shall the Heavens and the Earth be wholly burnt up and destroyed, or only renewed and purified? These Words, as clearly as they seem to referr to the Dissolution of the World, yet Dr. Hammond doubts not to be understood of the remarkable Destruction of Jerusalem, and the Jewish State, he thus paraphrasing them.

Verse 10. But the Day of the Lord will come as a Thief in the Night, in which the Heavens skall pass away with a great Noise, and the Elements shall melt with fervent Heat, and the Earth also, and

the Works that are therein shall be burnt up.

But this Judgment of Christ, so remarkable on the Jews, shall now shortly come, and that very discernably; and the Temple shall suddenly be destroyed, the greater Part of it burnt, and the City and People utterly consumed.

Verse 11. Seeing then all these Things shall be dissolved, what Manner of Persons ought ye to be in all boly Conversation and Godliness?

SEEING then this Destruction shall thus involve all, and now approacheth so near, what an Engagement doth this lay upon us to live the most pure strict Lives that ever Men lived?

Verse 12. Looking for and hastning unto the Coming of the Day of God, wherein the Heavens, being on Fire, shall be dissolved, and the Elements shall melt with fervent Heat.

LOOKING for the Coming of CHRIST for our Deliverance, and by our Christian Lives quickning and hastning God to delay it no longer; that Coming of His, I say, which as it significs great Mercy to us, so it signifies very sharp Destruction to the whole Jewish State.

Verse

Verse 13. Nevertheless we, according to His Promise, look for new Heavens and a new Earth, wherein dwelleth Righteousness.

INSTEAD of which we look for a new Christian State, wherein all Provision is made by Christ for Righteousness to inhabit, according to the Promise of Christ concerning the Purity that He should plant in

the Evangelical State.

How he makes out and confirms this Paraphrase, see in his Annotations upon this Place. So confident is he of the Truth of this his Interpretation, that he censures the usual one as a great Mistake, in his Annotation on ver. 10. where he thus writes; 'What is here thus expressed by S. Peter, is ordinarily conceived to belong to the End of the World, and by others applied to the End of this World, and the Beginning of the Milleninium, or Thousand Years. And so, as S. Peter here faith, ver. 16. many other Places in S. Paul's Epistles, and in the Gospel, especi-'ally Matth. xxiv. are mistaken and wrested. That it doth not belong to either of those, but to this fatal Day of the Jews, sufficiently appears by the Purport of this whole Epistle, which is, to arm them with Constancy and Perseverance till that Day come; and par-ticularly in this Chapter, to confute them who object against the Truth of CHRIST's · Pre-

Predictions, and refolve it should not come at all: Against whom he here opposes the Certainty, the Speediness, and the Terribleness of its Coming. That which hath given Occasion to those other common Mistakes, is especially the Hideousness of those Judgments which fell upon the People of the Fews, beyond all that ever before are related to have fallen upon them, or indeed a-'ny other People, which made it necessary for the Prophets, which were to describe it, ' (and who use Tropes and Figures, and not plain Expressions, to set down their Predistions) to express it by these high Phrases, of the passing away and dissolving of Heaven and Earth, and Elements, Gc. which founding very tragically, are mistaken for the great ' and final Dissolution of the World." So far the Doctor. Two Things there are in this Chapter, which seem to contradict this Interpretation: First, That the Destruction here spoken of, is compared with Noah's Flood; and the Heaven and Earth to be diffolved by this, made parallel, and of equal Extent to the World destroyed by that. Of this the Doctor was well aware, and therefore grants, that the seventh Verse, But the Heavens and the Earth which are now, by the same Word are kept in Store, reserved unto Fire against the Day of Judgment, and Perdition of ungodly Men, is to be understood of the general and final Destruction of the World by Fire,

Fire, but the following Verses to be an Answer to the first Part of the Atheists Obje-Etion, viz. Where is the Promise of His Coming? To me it seems, that all referr to the same Matter. The fecond Thing which feems to contradict the Doctor's Interpretation, is, the Apostle's citing for the Instruction and Confirmation of the Believers, and in Answer to the Atheists Objection, (Where is the Promise of His Coming?) that Place of the Pfalmist, P[al. xc. 4. That one Day is with the LORD as a thousand Years, and a thousand Years as one Day. For the Apostle seems to suppose, that the Time of Christ's Coming might possibly be a thousand Years off; and that they were not to think much, or distrust the Promise, if it were so: For though it were predicted as a thing shortly to come, yet they were to consider, that a thousand Years in God's Sight is but a very short Time, so that it might be foretold as shortly to come, tho' it were a thousand Years off. Whereas it might feem improper to mention a thoufand Years to support them in Expectation of an Event that was not twenty Years to come.

ANOTHER Place, where Mention is made of Christ's coming to Judgment, and the Dissolution of the World, is Matth. xxiv. to which may be added as Parallel, Mark xiii. and Luke xxi. In which Places you have considerable, The Suddenness of Christ's Coming, ver.

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27. As the Lightning comes out of the East. and shineth even unto the West, so shall the Coming of the Son of Man be. 2. The Signs of His Coming, v. 29. Immediately after the Tribulation of those Days skall the Sun be darkned, and the Moon shall not give her Light, and the Stars shall fall from Heaven, and the Powers of Heaven shall be shaken. 3. The Manner of His Coming, v. 30. And then shall appear the Sign of the Son of Manin Heaven; and then shall all the Tribes of the Earth mourn, when they shall see the Son of Man coming in the Clouds of Heaven with Power and great Glory. And He shall send His Angels with a great Sound of a Trumpet. and they shall gather together His Elect from the four Winds, from one End of Heaven to the other. 4. The Uncertainty of the Time of His Coming, and this Dissolution as to us. But of that Day and Hour knoweth no Man, no not the Angels in Heaven: And Mark adds. neither the Son, but the Father only.

ALL this Prophecy Dr. Hammond understands of the Destruction of the City and Temple of Jerusalem, and whole Nation of the Fews; as may be seen in his Paraphrase and Annotations upon this Place. And indeed, our Saviour Himself seems to limit it to this, saving, verse 24. Verily I say unto you, this Generation shall not pals away, till all these things be fulfilled. For if these Prophecies look farther than the Destruction of

Ferusalem, even to Christ's coming to Judgment, how could it be true, that that Generation should not pass away till all those Things were fulfilled? Whereas we see that that Generation is long since passed away, and yet the End is not come. And indeed, Expositors that understand them of the End of the World, and Christ's fecond coming to Judgment, are hard put to it to answer this Objection. S. Chrysoftom will have this Word yeveà to be understood not of the Generation of Men then living, but of the Generation of the Faithful, which should not fail till the End of the World. Olde vap (saith he) γενεάν ἐκ ἀπὸ χρόνων χαρακτηρίζειν μόνον, ἀλλ ἀπὸ τρόπε θρησιείας καὶ πολιτείας, ὡς ὅταν λέγη, Αὐτη ἡ γενεὰ ζητέντων σε, &c. He denominates a Generation not only from living
together in the same time, but from having the same Form and Manner of religious Wor-Ship and Polity; as in that Place, This is the Generation of them that seek thee, that seek thy Face, O Jacob. Beza understands yeveà of the present Age, and will have it to be of the same Valour with Tir Hebrew, and πάντα ταῦτα, to referr not to all Particulars mentioned in this Chapter, but only to those which are spoken of the Destruction of the City and Nation of the Jews: But (faith he) if any one urgeth the universal Particle, Vertere licebit, Fiant omnia, viz. quæ ultimam illam diem præcessura dixit. Nam ab illo tempore

tempore experunt sieri, & adhuc perseverant illa signa, suo demum tempore Filio hominis venturo.

But on the other Side, 1. Some Passages there are in this Chapter, which are hardly applicable to the Destruction of Jerusalem, and the Dissolution of the Jewish Commonwealth; as the Appearing of the Sign of the Son of Man in Heaven, and the Tribes seeing the Son of Man coming in the Clouds of Heaven with Power and great Glory. And His sending His Angels with a great Sound of a Trumpet. 2. The Coming of CHRIST is in like manner described in Places which undoubtedly speak of His coming to Judgment at the End of the World. As in I Cor. xv. 52. Mention is made of the Trumpets sounding at the Time of CHRIST'S Coming: And I Theff. iv. 16. it is said, The LORD Himself shall descend from Heaven with the Voice of the Archangel, and with the Trump of God; and. v. 17. We that are alive shall be caught up together with them [that are risen] in the Clouds to meet the LORD in the Air. All which Places are perfectly parallel, and feem manifestly to allude to the fore-mentioned Words, Matth. xxiv. 30, 31. I am apt to think that these Prophecies may have a double Respect; one to the City, Temple, and Nation of the Jews; another to the whole World at the great Day of Doom: And that the former is indeed typical of the latter: And so they have X 4 a doua double Completion; the first in the Destruction of Ferusalem and the Fewish Polity: In Reference to which it is truly said, This Generation shall not pass away till all these things be fulfilled. The second in the final Dissolution of the World, which is yet to come.

Bur to proceed; Another Place which is usually understood of the Dissolution of the World by Fire, is 2 Theff. i. 7, 8. When the LORD JESUS Shall be revealed from Heaven with His mighty Angels in flaming Fire, &c. Other parallel Places may be seen, Rev. vi. 12, 13, 14. Rev. x. 6. Rev. xxi. 1: And I faw a new Heaven and a new Earth, for the first Heaven and the first Earth were passed away, and there was no more Sea, Hebr. xii. 26, 27. These Places speak more directly of the Dissolution of the World, and the Coming of Christ to Judgment. Others there are, that speak only concerning the Time of it, i Pet. iv. 7. But the End of all Things is at hand. James v. 9. Behold the Judge standeth before the Door. 1 John ii. 18. Little Children, it is the last time; or as some translate it, the last Hour, ἐσχάτη ὧρα. Hebr. x. 37. Tet a little while, and He that shall come will come, and will not tarry, winest book book. Luke xviii. 17. I tell you be will avenge them speedily. All these Places the forementioned Dr. Hammond still applies to that famous Period of the Destruction of the City, Temple and

and Polity of the Jews; only in his Note upon ὁλεθρος ἀιώνιος, that everlasting Destruction mentioned 2 Thess. i. 9. he hath some Qualification, saying thus: Mean while, not excluding the eternal Torments of Hellsire, which expect all impenitent Sinners that thus fall, but looking particularly on the visible Destruction and Vengeance which seizeth on whole Nations or Multitudes at once in this Life. And in Conclusion hath left us but one Place in the New Testament, to prove the general Constagration of the World, viz. 2 Pet. vii. 7.

Now, because some have been offended at these Interpretations of his, others have spoken very slightingly of them: I shall briefly sum up what hath been alledged in Desence

of them by this great Man.

1. That the Prophets use to set down their Predictions in Tropes and Figures, and not in plain Expressions, (their Style being Poetical.) And therefore, in describing those hideous Judgments which fell upon that People of the Jews, beyond all that ever before fell upon them, or indeed any other People, they found it necessary to employ those High and Tragical Phrases of the passing away and dissolving Heaven, and Earth, and Elements. And that this was the Manner of the Prophets, may be proved; because we find the Destruction of other Places described in as high Strains, as losty and tragical Expressions.

sions as this of Jerusalem. For Example, that of Idumea, Isa. xxxiv. 9. The Streams thereof shall be turned into Pitch, and the Dust thereof into Brimstone, and the Land thereof shall become burning Pitch. It shall not be quenched Night nor Day, the Smoke thereof shall go up for ever. And in the 4th Verse he seems but to preface to this Destru-Ation, in these Words; And all the Host of Heaven shall be dissolved, and the Heavens shall be rolled together as a Scroll; and all their Hosts shall fall down as the Leaf falleth off from the Vine, and as a falling Fig from the Fig-Tree; for my Sword shall be bathed in Heaven: Behold it shall come down upon Idumæa. 'And in the Burden of Babylon; cap. xiii. 8, 9. we have these Words, Behold the Day of the Lord cometh, cruel both with Wrath and fierce Anger to lay the Land desolate: For the Stars of Heaven, and the Constellations thereof shall not give their Light: The Sun shall be darkened in his going forth. and the Moon shall not cause her Light to Thine.

Matth. xxiv. to which all other Places in the New Testament relating to this Matter are parallel, are by our Saviour Himself restrained to the Destruction of Jerusalem, and the full Completion of them limited to the Duration of that Age: Verse 34. Verily I say unto you, This Generation shall not pass till all

all these Things be fulfilled. What Reason then can we have to extend them farther?

3. In most of the Places where this Coming of Christ is mentioned, it is spoken of as near, and at hand; as in the Places laft: cited. Now, (faith the learned Doctor) in his Note upon Luke xviii. 7. I tell you he will avenge them speedily. 'All which, if (when it is said to approach and to be at the door) 'it belonged to the Day of Judgment (now after so many hundred Years not yet come) what a μακροθυμία were this? What a Delay ing of His Coming? And consequently, What an Objection against the Truth of the Christian Religion? As Mahomet, having promised after his Death he would presently return to Life, and having not performed his Promise in a thousand Years, is by us justly condemned as an Impostor.

4. That this Place of S. Peter, out of which I have taken my Text, doth not belong to the End of the World, sufficiently appears (saith he) by the Purport of this whole Epistle, which is to arm them with Constancy and Perseverance till that Day come, and particularly in this Chapter to consute them who object against the Truth of Christ's Predictions, and resolve it should not come at all; against whom he here opposes the Certainty, the Speediness, and the Terribleness of its Coming. And for that other famous Place, 2 Thess. i. 8, 9. that it

belongs to the same Period. See how he makes it out in his Annotations.

I shall now superadd some Places out of the Old Testament, which seem to speak of the Dissolution of the World, Job xiv. 12. Man lieth down and riseth not till the Heavens be no more. Psal. cii. 5, 6. quoted Hebr. i. 10, 11. Of old hast thou laid the Foundations, of the Earth, and the Heavens are the Works of Thy Hands. They shall perish, but Thou remainest; and they all shall wax old as doth a Garment, and as a Vesture shalt Thou change them, and they shall be changed, Isai. xxxiv. 4. And all the Host of Heaven shall be dissolved. and the Heavens shall be rolled together as a Scroll, and all their Host skall fall down as a Leaf falleth from the Vine, &c. Isai. li. 6. The Heavens shall vanish away like Smoke, and the Earth shall wax old like a Garment, Joel ii.3 1. The Sun shall be turned into Darkness, and the Moon into Blood, before that great and terrible Day of the Lord comes. Malachi iv. 1. Bebold the Day cometh that shall burn like an Oven, &c. Deut. xxxii. 22. For a Fire is kindled in my Anger, and shall burn to the lowest Hell, and shall consume the Earth with her Increase, and set on Fire the Foundations of the Mountains. I must confess, that the Prophetick Books are full of Figurative Expressions, being written in a Poetick Style, and according to the Strain of the Oriental Rhetorick, which is much different from

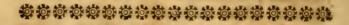
the European, affecting lofty and tumid Metaphors, and excessive Hyperbola's and Aggravations, which would either found harsh to our Ears, or import a great deal more to us than they did to them. This is obvious to any one that reads their Books; and may clearly be demonstrated from the Titles that their Kings assumed to themselves, as well anciently as lately, viz. Sons of the Sun, Brethren of the Sun and Moon, Partners of the Stars, Lions crowned in the Throne of the World, endued with the Strength of the whole Heaven, and Virtue of the Firmament. Now, we cannot possibly imagine them so vain, as to think themselves literally to be fuch: No fure, all they meant by these Expressions, was, that they were great, and ho-nourable, and powerful. Now, the Prophetick Books of the Old Testament being written in a Style somewhat conformable to the Oratory of those Countries, are not (I humbly conceive) in every Tittle to be so exactly scanned and literally expounded, but so to be interpreted, as a Jew or an Asiatick would then have understood them. And this I rather think, because there be divers Passages in the Prophets, which cannot be verified in astrict literal Sense; as in the Place before quoted, Isa. xxxiv. 9. it is faid of the Streams of Idumæa, that they should be turned into Pitch. and the Dust thereof into Brimstone; and the Land thereof should become burning Pitch,

and should not be quenched Night nor Day ; but the Smoke thereof should go up for ever. And of the City of Tyre it is said, Ezek. xxvi. 14. It shall be built no more. And ver. 19. When I shall make thee a desolate City, like the Cities that are not inhabited, when I shall bring up the Deep upon thee, and great Waters shall cover thee. And Verse 21. which is thrice repeated, I will make thee a Terror, and thou shalt be no more; though thou be sought for, thou shalt never be found again, faith the LORD GOD. And yet we see that the City of Tyre, tho' it was indeed wholly dispeopled at that Time, the Inhabitants transferring themselves into Africa, when it was belieged by Nebuchadnezzar; yet was it afterward peopled again, and continues a City inhabited to this Day. And of Babylon, it is faid, that there should none remain in it, neither Man nor Beast, but that it should be desolate for ever, Jer. li. 62. Isai. xiii. 20. and of the Land of Babylon, v. 29. that it should be a Desolation without an Inhabitant. And though indeed this Prophecy was, I think, as to the City, at last verified in the Letter; yet did Babylon long continue a great City after this Prophecy: And the Land of Babylon is now inhabited, there being at this Day a great City not far from the Place where Babylon stood. So that these Places import no more, than that there should be a very great Destruction and Devastation

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of those Cities and Countries. As for those Places in the Old and New Testament, wherein Mention is made of the last Days and the last Times, it is clear that they are to be understood of the Age of the Messiah, all the time from the Exhibition of the Messiah to the End of the World. Isaiah ii. 1. And it shall come to pass in the last Days, that the Mountain of the Lord's House shall be established in the Top of the Mountains, and shall be exalted above the Hills, and all Nations Shall flow to it; which very Words we have repeated Micab iv. 1. So in that Prophecy of Joel ii. 28. quoted Acts ii. 17. And it shall come to pass in the last Days, saith God, I will pour out of my Spirit upon all Flesh, &c. it is clear the last Days are to be understood. The Apostle Peter interpreting the Prophecy, (ver. 16.) of the Gift of Tongues bestowed upon the Disciples at that time. Hence the last Days have among the Jews proverbially fignified the Days of the Messiah, as Doctor Hammond in his Annotations upon this Place tells us; who also notes, that in that Place of Joel, the last Days do literally fignify the last Days of the Jews, immediately preceding their Destruction, called there the great and terrible Day of the LORD. So Hebr. i. 2. by έπ' ἐσχάτων τῶν ἡμερῶν τέτων, in these last Days, is meant the Days of the Meshas. So I Pet. i. 20. 2 Pet. iii. 3. 1 Tim. iv. 1. 2 Tim. iii. 1. Mention is made

of the last Days in this Sense. In like manner, the End of the World, συντέλεια τε ἀιῶνος, Heb. ix. 26. But now once in the End of the World bath He appeared to put away Sin by the Sacrifice of Himself. And τὰ τέλη τῶν ἀιώνων, the Ends of the World, in 1 Cor. x. 11. upon whom the Ends of the World are come, signify the Age of the Messias, though indeed the former seems more peculiarly to denote the Shutting up of the Jewish Age or OEconomy.



### CHAP. III.

The Testimonies of the Ancient Fathers and Doctors of the Church, concerning the Dissolution of the World.

2. USUSCISSES PROCEED now to what the Ancient Fathers of the Church and Christian Writers have delivered concerning the Diffolution of the World.

THAT there should be a Dissolution of this World, and that it shall be by Fire, is so certain and clear among them, that it would be superstuous to cite Particulars to prove it: Nay, so general and unanimous is the Consent of all Christians in this Point, that, as Ori-

gen observes in his third περί 'Αρχών, and the learned Doctor Hakewill after him, whereas there can hardly be named any Article of our Faith, which some Hereticks have not presumed to impugn or call in Question, yet not any to be met with who question this; but herein all agree, being compelled (faith Origen) by the Authority of the Scriptures. As for the Time of this Diffolution, the ancient Christians held it to be at hand, as might easily be proved by many Testimonies, were it not granted on all Hands. And here it may be worth the obferving, that the longer the World stood, the farther off generally have Christians set the Day of Judgment, and End of it. Many of the Ancients did conceive, that the Dissolution should be at the End of six thousand Years. As for Example, Justin Martyr, in Quast. & Resp. ad Orthodoxos, if he be the Author of that Piece, where this Question Author of that Piece, where this Question (When the End of the World should be?) being put, the Answer is, "Ενεςι διὰ πολλῶν γραφιαῶν μαρτυριῶν, &c. We may rationally conjecture and conclude from many Scripture Expressions, that they are in the right, who say that the World will last six thousand Years. For in one Place it saith, In these last Days; and in another, Upon whom the Ends of the World are come; and in a third, When the Euleus of Time was some. Now, it is exis-Fulness of Time was come. Now it is evident. Y

dent that these things were spoken in the sixth Millenary.

IRENAUS adv. bæref. lib. 5. cap. ult. who gathers so much from the Similitude of the fix Days Creation, after which fix Days was the Sabbath, that is, the Day of Rest; Hoc autem (saith he) est & præteritorum narratio, & futurorum prophetia. Dies enim unus mille annos significabat, sicut Seriptura testa-\* 2 Pet.iii-tur; \* Mille anni ante Dominum sicut Dies unus: ergo sicut consummatus fuit mundus in fui creatione intra sex dierum spatium, & postea quies; sic in sui fine consummabitur intra spatium sex millium annorum, deinde vera & perpetua quies subsequetur. This is both a Narration or History of what is past, and a Prophecy of Things to come. For one Day signified a thousand Years, as the Scriptures testify, A thousand Years in the Sight of God are but as one Day. Therefore, as the World at the first Creation was consummated in the Space of six Days, and afterwards followed the Sabbath or Rest; so, in the end, its Duration shall be consummated within the Space of Six thousand Years; and then shall follow the true

and perpetual Rest.

To these I might add Lactantius, in his Seventh Book of Institut. cap. 14. who useth the same Argument with Irenaus, Ergo quoniam sex diebus cuncta Dei opera perfecta sunt: per secula sex, id est, sex annorum millia manere in hoc statu mundum necesse est.

Dies

Dies enim magnus Dei mille annorum circulò terminatur, sicut indicat Propheta, qui dicit, Ante oculos tuos, Domine, mille anni tanquam dies unus, &c. Therefore, because all the Works of God were perfected (or finished) in six Days; it is necessary (or necessarily follows) that the World shall continue in this State six Ages; that is, Six thousand Years. For, the great Day of God is terminated in a Circle of Six thousand Years; as the Prophet intimates, who faith, A thousand Years in Thy Sight, O LORD, are but as one Day. S. Augustin, 1. 20. de Civitate Dei. S. Hieronymus Comment. in Mich. cap. 4. Most clear and full to this purpose is Eustath. in his Comment. in Hexaëmeron, Λογιζόμεθα γαρ διαμείναι την πτίσιν, &ε. We reckon (saith he) that the Creation shall continue till the End of the fixth Chiliad, because GOD also consummated the Universe in six Days; and, I suppose, that the Deity doth account Days of a thousand Years long; for that it is said, A thousand Years are in the Sight of the Lord as one Day. Howbeit, the most of them did not propose this Opinion as an undoubted Truth, but only as a modest Conjecture. And S. Austin is very angry with them, who would peremptorily conclude from so slight an Argumentation.

This Conceit is already confuted, and the World hath long outlasted this Term, according to their Computation who followed the Septuagint or Greek Account, and reckoned

that Phaleg lived about the Three thoufandth Year of the World, and had his Name from his living in the Division of Time, there being to come after him Three thousand Years, that is, just so many as were past before him.

As concerning the future Condition of the World after the Conflagration, I find it the general and received Opinion of the ancient Christians, that this World shall not be annihilated or destroyed, but only renewed and purified. So Eusebius, Οὐ παντελῶς πρὸς Φθορὰν ὁ νόσμος χωρήσει, ἀλλὰ πρὸς ἀναnaινισμόν. The World shall not be wholly de-stroyed, but renewed. Divers other Passages I might produce out of him to the same purpose: Cyril of Jerusalem, Catech. 15. Ειλίσσει ζ τες έρανες, εκ ίνα απολέση τέτες, αλλ' ένα παλλίονας έγείρη. He folds up the Heavens, not that he might destroy them, but that he might rear them up again more beautiful. Again, Cyril upon this Place, Θάνατον δε των 50ιχείων εὐΦυῶς ὀνομάζει την είς τὰ ἀμείνω μεταβολήν, &c. He acutely or ingeniously calls the Death of the Elements their Change into better. So that this Renovation in respect of the Creation, shall be such a kind of thing as the Refurrection in reference to Man's Body. OEcumenius, upon this Place, He faith, new Heavens, and a new Earth, su ετέραν δε τη θλη, yet not different in Matter. And again, έκ είς άφανισμον άλλ' είς κάθαρσιν-They

They shall not be destroyed or annihilated. but only renewed and purified. And upon Rev. xxi. 2. Τέτο έ την ανυπαρξίαν δηλών της ητίσεως, αλλά τον αναπαινισμόν. This he faith, not denoting the Non-existence of the Creation, but the Renewing. In this manner he expounds Psalm cii. 5, 6. and proceeding, saith, We may here take Notice, that the Apostle doth not use the Word ἀπῆλθεν, as if the Heaven and Earth were annihilated and brought to nothing; but μετέβη, they passed away, or removed, or changed State. S. Hierome upon the Pfalms, Pfalm cii. faith, Ex quo oftenditur perditionem calorum non interitum sonare, sed mutationem in melius. From which Words [as a Vesture shalt thou change them ] may be shown and made out, that the Diffolution of the Heavens doth not fignify their utter Destruction or Annihilation, but only their Change into a better State. I might add abundance more Testimonies, but these, I think, may fuffice.





### CHAP. IV.

The Opinions of the Ancient Heathen Philosophers, and other Writers concerning the Dissolution.

an Account what I give you an Account what the ancient Philosophers and Sages among the Heathens thought and delivered concerning this Point. Two of the four principal Sects of Philosophers held a future Dissolution of the World, viz. The

Epicureans and Stoicks.

As for the *Epicureans*, they held, that as the World was at first composed by the fortuitous Concourse of Atoms, so it should at last fall in Pieces again by their fortuitous Separation, as *Lucretius* hath it, lib. 5.

Principio maria ac terras cælúmque tuere, Horum naturam triplicem, tria corpora, Memmi, Tres species tam dissimiles, tria talia texta Una dies dabit exitio, multosque per annos Sustentata ruet moles & machina mundi.

But now to prove all this; first cast an Eye, And look on all below, on all on high, The solid Earth, the Seas, and arched Sky: Sone fatal hour at last must ruin all, This glorious Frame, that stood so long, must fall.

This Opinion of theirs is consonant enough to their wild Principles, save only in that Point of its Suddenness, Una dies dabit exitio, &c. One day shall destroy or make an end

of it.

THE Stoicks were also of Opinion, that the World must be dissolved, as we may learn from the Seventh Book of Laertius, in the Life of Zeno, 'Apéonei d' autois, &c. They hold, that the World is corruptible for these Reasons; 1. Because it was generated, and had a Beginning. 2. Because That is corruptible in the whole, whose Parts are corruptible: But the Parts of the World are corruptible, being daily transmuted one into another. 3. That which is capable of Mutation, from better to worse, is corruptible. But such is the World; sometimes being afflicted with long Heats and Droughts, sometimes with continued Showers and Inundations. To these we may add, 4. according to some of their Opinions, Because the Sun and Stars being fed with Vapours exhaled from the Earth, all the Moisture will at. length be drawn out, and the World fly on fire. They were afraid, \* Nè humore omni \* Minuta consumpto totus mundus ignesceret. The Poet Felix. Lucan, who feems to be of the Stoick Sect, in the Beginning of his First Book, describing the Dissolution of the World, makes it to be a Falling in Pieces of the whole Frame of

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Heaven

# Of the Dissolution

Heaven and Earth, and a Jumbling and Confounding of all their Parts together.

Secula tot mundi suprema coëgerit hora;
Antiquum repetent iterum Chaos omnia; mistis
Sydera syderibus concurrent; ignea Pontum
Astra petent, tellus extendere littora nolet,
Excutietque fretum; fratri contraria Phoebe
Ibit, & obliquum bigas agitare per orbem
Indignata diem poscet sibi; totaque discors
Machina divulsi turbabit fadera mundi.

So many Ages end, and this disjointed, All To Chaos back return; then all the Stars shall be Blended together; then those burning Lights on high

In Sea shall drench; Earth then her Shores

Shall not extend,

But to the Waves give Way; the Moon her

Course shall bend

Cross to her Brothers, and disdaining still to

Her Chariot Wheel athwart the heavenly Orb,

Shall Strive

To rule the Day; this Frame to Discord bent, The World's Peace shall disturb, and all in sunder rent.

This Dissolution of the World, they held, should be by Water and by Fire alternately at certain Periods, but especially by Fire, which

which they call ἐκπύρωσιν. Philo, Oi δὲ Στωϊκοὶ τῆς Φθορᾶς τε κόσμε αἰτίαν Φασὶ τὴν ὑπάςγεσαν εν τοις έσι πυρος απαμάτε, δύναμιν, χεόνων μακραῖς περιόδοις ἀναλύεσαν τὰ πάν-τα εἰς ἐαυτόν. The Stoicks say, that the Cause of the Destruction of the World is the irrefistible Force of Fire that is in things, which, in long Periods of Time, consumes and dis-solves all things into itself. Euseb.Præp.l.15. Αρέσκει 🥱 τοις πρεσβυτάτοις τῶν ἀπὸ τῆς αίρέσεως, έξαει εσθαι πάντα κατά περιόδες τινάς μεγίsas, είς πύρ αίθερῶδες αναλυομένων πάντων. The most ancient of that Sect held, That at certain vast Periods of Time all things were rarified into Air, being resolved into an Ethereal Fire. This Eunipeous of the Stoicks we find mentioned by many, both Christian and Heathen Writers, as besides the fore-quoted Minutius Felix, Justin Martyr, Clemens Alexandrinus in 5. Strom. Plutarch, Seneca, and others. The Time of this Conflagration Seneca determines not, but faith only, it shall be when God pleases. 3 Quest. Nat. cap. 20.8. Cum Deo visum, vetera finire, ordiri meliora; When it shall seem good to God to put an End to old things, and to begin better. Some there be who tell us of the Annus Platonicus or Magnus, by which they understand such a Period of Time, as in which all the heavenly Bodies shall be restored to the same Site and Distance they were once in, in respect of one another: As supposing that all the Seven Pla-

nets were at the Moment of Creation in the first Degree of Aries, till they come all to be in the same Degree again; all that Space of Time is called the Great Year, Annus Magnus. In this Year they tell us, that the Height of Summer is the Conflagration, and the Depth of Winter the Inundation; and some Aftrologers have been so vain as to affign the Time both of the Inundation and Conflagration. Seneca, 3 Quaft. Nat. cap. 20. Berosus, qui Belum interpretatus est, dicit, cursu ista syderum sieri, & adeò quidem affirmat, ut conflagrationi atque diluvio tempus assignet. Arsura enim terrena contendit, quando omnia sydera in Cancro convenerint: inundationem futuram, quando eadem syderum turba in Capricorno convenerit. Berosus, who interpreted Belus, saith, That those things come to pass according to the Course of the Stars: and he so confidently affirms it, that he assigns the Time both for the Conflagration and Inundation. For that all earthly Bodies will be burnt up, when all the Stars shall meet in Cancer; and the Inundation will fall out, when the same shall be in Conjunction in Capricorn. Concerning the Manner of this Conflagration, they held it should be sudden. Senec. Natura subitò ad ruinam, & toto impetu ruit; licet ad originem parce utatur viribus, dispensetque se incrementis fallacibus. Momento fit cinis, diu sylva,&c. Nature doth suddenly, and with all its Force, rush on to Ruin; though, to the Rise and Formation

mation of Things, it useth its Strength sparingly, dispensing its Influence, and causing them to grow by insensible Degrees; a Wood is long in growing up, but reduced to Ashes almost in a Moment. And some of them were so absurd as to think, that the Stars should justle and be dashed one against another. Senec. lib. de consolatione ad Marciam: Cùm tempus advenerit, quo se mundus revocaturus extinguat, viribus ista se suis cadent; & sydera syderibus incurrent; & omni flagrante materia, uno igne, quicquid nunc ex disposito lu-cet, ardebit. When the Time shall come, that the World, again to restore and renew itself, shall perish, these things shall batter and mall themselves by their own Strength, the Stars shall run or fall foul upon one another, and all the Matter flaming, what soever now, according to its settled Order and Disposition, Shines, Shall then burn in one Fire. Here, by the way, we may, with Dr. More, Soul's Immortality, lib. 3. cap. 18.] take notice, how coarfly, not to fay ridiculously, the Stoicks philosophize, when they are turned out of their Road-' way of Moral Sentences, and pretend to ' give an Account of the Nature of Things. For, what Errors can be more gross than they entertain of God, of the Soul, and of the Stars? they making the two former corporeal Substances, and feeding the latf ter with the Vapours of the Earth; affirming that the Sun sups the Water of the great

great Ocean to quench his Thirst, but that the Moon drinks off the lesser Rivers and Brooks; which is as true as that the Ass drank up the Moon. Such Conceits are more sit for Anacreon in a drunken Fitt to stumble upon, who, to invite his Companions to tipple, composed that Catch,

Πίνει θάλασσα δ' αὐρας, Ο δ' ήλιος θάλασσαν.

The Sea drinks up the Vapours, And the Sun the Sea.

than to be either found out or owned by a ferious Philosopher. And yet Seneca mightily triumphs in this Notion, of foddering the Stars with the thick Fogs of the Earth, and declares his Opinion with no mean

Strains of Eloquence, &c.

As for the Extent of this Conflagration, they held, that not only the Heavens should be burnt, but that the Gods themselves should not escape Scot-free. So Seneca, Refoluto mundo, & Diis in unum confusis. When the World shall be dissolved, and the Gods confounded and blended together into one. And again, Atque omnes pariter Deos perdet now aliqua & Chaos. And, in like manner, a certain Night and Chaos shall destroy all the Gods. Is not this wise Philosophy? If their Morality were no better than their Physicks, their Wise Man they boast of, might be so denominated, ματ' ἀντίφρασιν, as they of Gotham.

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But let us look a little farther, and we shall find, that the Stoicks were not the first Authors of this Opinion of the Conflagration: but that it was of far greater Antiquity than that Sect. Others of the more ancient Philosophers having entertained it, viz. Empedocles, as Clemens Alexandrinus testifies in his 5 Strom. 'Ως έσομένης ποτέ είς την τε πυρός έσίαν μεταβολής · That there shall some time be a Change of the World into the Nature or Substance of Fire. 2. Heraclitus, as the same Clemens shews at large out of him in the fame place, ὅπως ἢ πάλιν ἀναλαμβάνεται καὶ ἐκπυρεται, &c. And Laertius, in the Life of Heraclitus, he taught, "Ενα είναι τον πόσμον, γεννασθαί τε αὐτὸν ἐκ πυρὸς, καὶ πάλιν ἐκπυρεσθαι κατά τινάς περιόδες εναλλάξ του σύμπαντα alώva. That there is but one World, and that it was generated out of Fire, and again burnt up or turned into Fire, at certain Periods alternately throughout all Ages. I might add to these the Ancient Greek Poets, Sophocles and Diphilus, as we find them quoted by Justin Martyr, and Clemens Alexandrinus. Neither yet were these the first Inventers and Broachers of this Opinion, but they received it by Tradition from their Forefathers, and look'd upon it as an Oracle and Decree of Fate. Ovid speaks of it as such, in the First of his Metamorphosis:

Esse quoque in fatis reminiscitur, affore tempus, Quo mare, quo tellus, correptaque regia cæli Ardeat, & mundi moles operosa laboret.

Of certain Fate, he knew the Time should come,

When Sea, Earth, ravish'd Heav'n, the curi-

Of this World's Mass should shrink in purging Flame.

### \*Lib. 7. And Lucan \*;

Hos Cæsar, populos si nunc non usserit ignis, Uret cum terris, uret cum gurgite ponti: Communis mundo superest rogus ossibus Astra Misturus.

If now these Bodies want their Fire and Urn, At last with the whole Globe they'll surely burn; The World expects one general Fire: And thou Must go where these poor Souls are wandring now.

Now, though some are of Opinion, that by Fata here are to be understood the Sibylline Oracles, and to that Purpose do alledge some Verses out of those extant under that Title, as Lastantius, in his Book De ira Dei, cap. 23.

Καί ποτε την δργην Θεον ενέτι πραύνοντα, 'Αλλ' έξεμβρίθοντα, καὶ έξολύοντά τε γένναν 'Ανθρώπων ἄπασαν ὑπ' εμπρησμε πέρθοντα. 'And it shall some time be, that God not any more mitigating His Anger, but aggravating it, shall destroy the whole Race of Mankind, consuming it by a Constagration.

And in another Place there is Mention made, of a River of Fire that shall descend from Heaven, and burn up both Earth and Sea.

Tunc ardens fluvius calo manabit ab alto Igneus, atque locos consumet funditus omnes, Terramque, Oceanimque ingentem, & carula ponti,

Stagnaque, tum fluvios, fontes, Ditémque se-

Calestémque polum, cali quoque lumina in u-

Fluxa ruent, formâ deletâ prorsus eorum, Astra cadent, etenim de calo cuncta revulsa.

Then shall a burning Flood flow from the Heav'ns on high,

And with its fiery Streams all Places utterly Destroy, Earth, Ocean, Lakes, Rivers, Fountains, Hell,

And heav'nly Poles, the Lights in Firmament that dwell,

Losing their beauteous Form shall be obscur'd, and all

Raught from their Places, down from Heav'n to Earth shall fall.

Now because the Verses now extant under the Name of Sibylline Oracles are all suspected to be false and Pseudepigrapha; and many of them may be demonstrated to be of no greater Antiquity than the Emperor Antoninus Pius his Reign; and because it cannot be proved, that there was any such thing in the Ancient genuine Sibylline Oracles; I rather think, (as I said before) that it was a Doctrine of ancient Tradition, handed down from the first Fathers and Patriarchs of the World. Josephus, in his Antiquities, runs it up as high as Adam, from whom Seth his Son received it; his Father, faith he, foretelling him, αφανισμόν των όλων έσεσθαι, τον μέν κατ λοχύν πυρός, τον ή κατά βίαν καὶ πλήθος ύδατος. That there should be a Destruction of the Universe, once by the Violence of Fire, and again by the Force and Abundance of Water; in Consequence whereof he erected two Pillars, one of Brick, which might endure the Fire, and another of Stone, which would resist the Water; and upon them engraved his Astronomical Observations, that so they might remain to Posterity: And one of these Pillars, he faith, continued in Syria until his Days. Whether this Relation be true or not, it may be thence collected, that this was an universal Opinion, received by Tradition, both among Jews and Gentiles, That the World should one Day be consumed by Fire. It may be proved by good Authority, that the

the ancient Gauls, Chaldaans, and Indians, had this Tradition among them; which they could not receive from the Greek Philosophers or Poets, with whom they had no Intercourse; but it must, in all Probability, be derived down to both from the same Fountain and Original; that is, from the first Restorers of Mankind, Noah, and his Sons.

I NOW proceed to the Third Particular proposed in the Beginning; that is, to give Answer to the several Questions concerning the Dissolution of the World.



## 

### CHAP. V.

The first Question concerning the World's Dissolution, Whether there be any thing in Nature that may probably cause or argue a future Dissolution? Three probable Means propounded and discussed.

#### SECT. I.

The Waters again naturally overflowing and covering the Earth.

there be any thing in Nature, which may prove and demonstrate, or probably argue and inferr a future Diffolution? To which I answer, That I think there is nothing in Nature which doth necessarily demonstrate a future Diffolution: But that Position of the Peripatetick Schools may, for ought I know, be true Philosophy; Posito ordinario Dei concursu mundus posset durare in aternum. Supposing the ordinary Concourse of God [with second Causes] the World might endure for exer. But though a future Dissolution by Natural Causes, be not demonstrable; yet

some possible, if not probable, Accidents there are, which, if they should happen, might inferr such a Dissolution. Those are Four: The Possibility of

1. THE Waters again overflowing and co-

vering the Earth.

2. THE Extinction of the Sun.

3. THE Eruption of the Central Fire enclosed in the Earth.

4. THE Driness and Inflammability of the Earth under the Torrid Zone, and the

Eruption of all the Vulcano's at once.

But before I treat of these, it will not be amiss, a little to consider the old Argument for the World's Dissolution, and that is, its daily Consenescence and Decay; which, if it can be proved, will in Process of time necesfarily inferr a Dissolution. For as the Apostle faith in another Case, That which decayeth and waxeth old is ready to vanish away. Heb. viii. 13. That which continually wastes, will at last be quite confumed; that which daily grows weaker and weaker, will in time lose all its Force. So the Age, and Stature, and Strength of Man, and all other Animals, every Generation decreasing, they will in the End come to nothing. And that all these and all other things do succeffively diminish and decay in all Natural Perfections and Qualities, as well as Moral, hath been the received Opinion, not only of the Vulgar, but even of Philosophers themselves from Antiquity down to our Times:

Times. Plin. Nat. Hist. l. 7. c. 16. In plenum autem cuncto mortalium generi minorem indies mensuram staturæ propemodum observatur: rarosque patribus proceriores consumente ubertatem seminum exustione; in cujus vices nunc vergat ævum. In sum; It is observed, that the Measure of the Stature of all Mankind decreases and grows less daily: And that there are few taller than their Parents; the Burning (to which the Age inclines) consuming the Luxury of the Seeds.

Terra malos homines nunc educat atque pufillos. Juvenal Sat.

The Earth now breeds Men bad and small.

And Gellius, Noct. Att. lib. 3. c. 10. Et nunc quasi jam mundo senescente rerum atque hominum decrementa sunt. And now, as if the World waxed old, there is a Decrement or Decay both of Things and Men. I might accumulate Places out of the Ancients and Moderns to this Purpose, but that hath been al-

ready done by others.

But this Opinion, how general soever it was formerly, was inconsiderately, and without sufficient Ground, taken up at first; and afterwards without due Examination embraced and followed, as appears by Dr. Hakewill's Apology, wherein it is so fundamentally confuted, that it hath fince been rejected by. all confiderate Persons. For that Author hath

at large demonstrated, that neither the pretended Decay of the Heavenly Bodies in regard of Motion, Light, Heat, or Influence, or of any of the Elements; neither the pretended Decay of Animals, and particularly and especially of Mankind, in regard of Age and Duration, of Strength and Stature, of Arts and Wits, of Manners and Conversation, do necessarily inferr any Decay in the World, or any Tendency to a Dissolution. For tho' there be at Times great Changes of Weather, as long continuing Droughts, and no less lasting Rains; excessive Floods and Inundations of the Sea; prodigious Tempests and Storms of Thunder, Lightning and Hail; which feem to threaten the Ruin of the World, violent and raging Winds, Spouts and Hurricanes, which turn up the Sea to the very Bottom, and spread it over the Land; formidable and destructive Earthquakes, and furious Eruptions of Vulcano's or Burning Mountains, which waste the Country far and wide, overwhelming or subverting great Cities, and burying their Inhabitants in their Ruins, or as the Scripture speaks, Making of a City a Heap, of a defenced City a Ruin. Though these and many other Changes do frequently happen, at uncertain Seasons as to us, yet are they so ordered by the wife Providence of the Almighty Creator and Governour of the World, as nearly to balance one another, Z 3

and to keep all things in an Aquilibrium; fo that as it is faid of the Sea, that what it gains in one Place, it loses in another, it may be faid proportionably of the other Elements and Meteors; That, for Example, a long Drought in one Place is compensated probably at the same time by as long a Rain in another; and at another time, the Scene being changed, by as durable a Drought in this, as lasting a Rain in that. The same may be faid of violent and continuing Heats and Colds in several Places, that they have the like Vicissitudes and Changes, whereby in the whole they so balance and counterpoise one another, that neither prevails over other, but continue and carry on the World as furely and steddily, as if there were no such Contrarieties and Fights, no such Tumults and Commotions among them. The only Objection against this Opinion, is the Longævity of the Antediluvian Patriarchs, and of some also (I mean the first) of the Postdiluvian. For immediately after the Flood, the Age of Man did gradually decrease every Generation in great Proportions; so that had it continued to to do at that Rate, the Life of Man' had foon come to nothing. Why it should at last settle at Threescore and ten Years, as a mean Term; and there continue so many Ages, without any farther Change and Diminution, is, I confess, a Mystery too hard for me to reveal: However, there must be

a great and extraordinary Change at the Time of the Flood, either in the Temperature of the Air, or Quality of the Flood, or in the Temper and Constitution of the Body of Man, which induced this Decrement of Age. That the Temper and Constitution of the Bodies of the Antediluvians was more firm and durable than that of their Posterity after the Flood: And that this Change of Term of Life was not wholly to be attributed to Miracle, may both be demonstra-ted from the gradual Decrease of the Age of the Postdiluvians. For had it been miraculous, why should not the Age of the very first Generation after the Flood have been reduced to that Term? And what Account can we give of their holding out for some Generations against the Inconveniencies of the Air, or Deteriority of Diet, but the Strength and Firmness of their Constitutions? which yet was originally owing to the Temperature of the Air, or Quality of their Diet, or both; feeing a Change in these (for there was no other visible Cause) did by Degrees prevail against, and impair it. What Influence the lying so long of the Water upon the Earth might have upon the Air and Earth, in changing them for the worse, and rendring them more unfit for the Maintenance and Continuance of Humane Life, I will not now dispute. But whatever might be the Cause of the Longavity of the Ante- . Z 4

Antediluvians, and the Contracting of the Age of the Postdiluvians, it is manifest, that the Age of these did at the last settle, as I said, at or about the Term of Threescore and ten, and hath there continued for Three thousand Years without any Diminution.

I PROCEED now to the Accidents which might possibly, in Process of Time, inferr a

Dissolution of the World.

I. THE Possibility of the Water, in Process of Time, again overflowing and covering of

the Earth.

For, first of all, the Rains continually washing down and carrying away Earth from the Mountains, it is necessary, that as well the Height as the Bulk of them that are not wholly rocky, should answerably decrease; and that they do so, is evident in Experience. For, as I have elsewhere noted, I have been informed by a Gentleman of good Credit, that whereas the Steeple of Craich, in the Peak of Derbyshire, in the Memory of some old Men then living [1672.] could not have been feen from a certain Hill lying between Hopton and Wirksworth, now not only the Steeple, but a great Part of the Body of the Church may from thence be seen; which comes to pass by the Sinking of a Hill between the Church and the Place of View: A parallel Example whereto the learned Dr. Plot gives us, in a Hill between Sibbertoft and Hasleby in Northamptonshire, Hist. Nat. Stafford. Stafford. p. 113. And thus will they continue to do fo long as there falls any Rains, and as they retain any Declivity, that is, till

they be leveled with the Plains.

In Confirmation of this Particular, I have received from my ingenious Friend Mr. Ed-ward Lhuyd, fome notable Observations of his own making concerning the Mountains of Wales; which do demonstrate that not only the looser and the lighter Parts of the Mountains, as Earth, Sand, Gravel, and small Stones, may be washed down by the Rains: But the most solid and bulky Rocks themselves, by the violent Descent of the Waters down their Chinks and Precipices, be in time undermined and subverted. Take them in his own Words:

'Upon the reading of your Discourse of the Rains continually washing away, and carrying down Earth from the Mountains,

I was put in mind of something pertinent thereto, which I have observed in the Moun-

tains of Caernarvonshire, viz.

1. FIRST, 'That generally the higher the Hills are, the more steep are their Precipices and Declivities, (I except the Sea Rocks) thus Moel y Wydhrha, y Grib gôtch, and twenty others that might be named, reputed the highest Hills in Wales, have the steepest Rocks of any Mountains I have feen; and that not only in their highest Cliss, but also in most of their other Crags,

till you descend to the lower Valleys: This I can ascribe to nothing else but the Rains and Snow which fall on those high Mountains, I think, in ten times the Quantity they do on the lower Hills and Valleys.

they do on the lower Hills and Valleys.

2. I HAVE observed a considerable Quantity of the Chips or Parings (if I may so call them) of these Cliffs to lie in vast Heaps at the Roots of them; and these are of several Sorts and Materials; being in some Places covered with Grass, and in others as bare as the Sea Shore: And those bare Places do consist sometimes of Gravel, and an innumerable Number of Rock Fragments, from a Pound Weight to twenty, Oc. and are sometimes composed of huge Stones, from an hundred Pound Weight to several Tuns.

3. In the Valleys of Lhanberys and Nant-Phrancon, the People find it necessary to rid their Grounds often of the Stones which the Mountain Floods bring down; and yet notwithstanding this Care, they of-

ten lose considerable Parcels of Land.

4. I AFFIRM, That by this means not only such Mountains as consist of much Earth and small Stones, or of softer Rocks, and such as are more easily dissoluble, are thus wasted, but also the hardest Rocks in Wales; and they seem to be as weighty, and of as sirm and close a Texture as Marble itself. It happen'd in the Valley of

Nant-Phrancon, Anno 1685. that Part of a Rock of one of the impendent Cliffs, call'd yr Hysvaë, became so undermined, (doubtless by the continual Rains and subterraneous Veins of Water occasioned by them) that losing its Hold it fell down in ' several Pieces, and in its Passage down a steep and craggy Cliff, dislodged thousands of other Stones, whereof many were intercepted e'er they came down to the Valley, but as much came down as ruin'd a small Piece of Ground; and several Stones were scatter'd at least 200 Yards asunder. In this Accident one great Stone, the biggest remaining Piece of the broken Rock. made fuch a Trench in its Descent, as the fmall Mountain Rills commonly run in; and when it came down to the plain Ground, it continued its Passage through a small Meadow, and a considerable Brook, and lodged itself on the other side it. ' From hence I gather, that all the other vast Stones that lie in our mountanous Val-' leys, have by such Accidents as this fallen down. Unless perhaps we may do better ' to referr the greatest Part of them to the ' universal Deluge. For considering there are some thousands of them in these two Valleys [of Lhanberys and Nant-Phran-' con] whereof (for what I can learn) there ' are but two or three that have fallen in the Memory of any Man now living; in the ordinaordinary Course of Nature we shall be compelled to allow the rest many thou-

fands of Years more than the Age of the

World." So far Mr. Lhuyd.

To this last Particular, and for a farther Account of it, may be added, That sometimes there happen strange and violent Storms and Hurricanes, wherein the Rain is driven with that Force upon the Tops and Sides of the Mountains by surious and tempestuous Winds, as to do more Execution upon them by breaking in Pieces, tearing and throwing down Rocks and Stones, in a few Days, than in the ordinary Course of Nature, by the usual Weather is effected in many hundred Years.

2. By reason of the Abundance of Earth thus washed off the Mountains by Shots of Rain, and carried down with the Floods to the Sea; about the Out-lets of the Rivers. where the violent Motion of the Water ceafes, fettling to the Bottom, and raising it up by Degrees above the Surface of the Water, the Land continually gains upon, and drives back the Sea: The Egyptian Pharos, or Light-House, of old Fime stood in an Island a good Distance from Land, which is now joined to the Continent, the interjacent Fretum having been filled up by the Silt brought down by the River Nilus in the Time of the Flood fubfiding there. Indeed, the ancient Historians do truly make the whole Land of Egypt to have been δώρου ποταμέ, the Gift of the

the River, and by this means gained from the Sea. Seneca, in the Sixth Book of his Nat. Quest. chap. 26. gives this Account, Ægyptus ex limo tota concrevit. Tantum enim (si Homero fides) aberat à continenti Pharos, quantum navis diurno cursu metiri plenis lata velis potest. Sed continenti admota est. Turbidus enim defluens Nilus, multumque secum limum trabens, & eum subinde apponens prioribus terris, Ægyptum annuo incremento semper ultra tulit. Inde pinguis & limosi soli est, nec ulla intervalla in se babet; sed crevit in solidum arescente limo, quo pressa erat & cedens structura, &c. that is, all Egypt is but a Concretion of Mud. For (if Homer may be believed) the Pharos was as far distant from the Continent, as a Ship with full Sail could run in a Day's time: but now it is joined to it. For Nilus flowing with troubled Waters brings down a great deal of Mud and Silt, and adding it to the old Land, carries on Egypt farther and farther still by an annual Increase. Hence it is of a fat and muddy Soil, and hath no Pores or Cavities in it. And this Reason he gives why it is not troubled with Earthquakes. Which also may be the Reafon why it hath no fresh Springs and Fountains: For though indeed Dr. Robinson doth very probably impute its Want of Rain and Springs to the Want of Mountains; yet because (as we shall afterwards prove) Springs may be derived from Mountains at a good Distance,

Distance, I know not whether all Mountains are so far remote from Egypt, as that there may be no subterraneous Channels of that Length, as to derive the Water even thither from them; and, therefore, probably one Reason of their Wanting of Springs may be the Density and Thickness of the Soil, whereby it becomes impenetrable to the Water; and it may be, should they use the same Artifices there, which the Inhabitants of the Lower Austria, and of the Territory of Modena and Bologna in Italy do, that is, dig and bore quite through this Coat of Mud till they come to a Sand, or looser Earth; they might, in like manner, procure themfelves Fountains of springing Water. Thus, by Reason of the great Rivers, Po, Athesis, Brenta, and others, which empty themselves into the Lagune, or Shallows about Venice in Italy, and in Times of Floods bring thown thirher great store of Earth; those Lagune down thither great store of Earth; those Lagune are in danger to be in time atterrated; and with the City situate in the midst of them, added to the firm Land, they being already bare at every Ebb, only Channels maintain'd from all the neighbouring Places to the City, not without considerable Charge to the State in Engines and Labourers in some Places to clear them of the Mud, wherewith otherwise they would indanger to be obstructed and choaked up; which Engines they call Cava-fango's. Thus in the Camarg,

Camarg, or Isle that the River Rhosne makes near Arles in Provence, there hath been fo much lately gained from the Sea, that the Watch-Tower had, in the Memory of some Men living 1665, been removed forward three times, as we were there informed; which I have already entred in this Work. And it feems to me probable, that the whole Low-Countrys were thus gained from the Sea: For, Varenius in his Geography tells us, 'That finking a Well at Amsterdam, at near a hundred Foot depth, they met with a Bed or Floor of Sand and Cockle-Shells; whence it is evident, one would think, that of Old Time the Bottom of the Sea lay fo deep, and that that hundred Foot Thickness of Earth above the Sand arose from the Sediments of the Waters of those great Rivers, the Rhine, Scheld, Maes, Gc. which thereabouts emptied themselves into the Sea, and in Times of Floods, brought down with them abundance of Earth from the upper "Grounds." The fame Original, doubtlefs, had that great Level of the Fens, running through the Isle of Ely, Holland in Lincoln-Shire, and Marshland in Norfolk. That there hath been no small Quantity of Earth thus brought down, appears also in that along the Channels of most great Rivers; as for Example, the Thames and Trent in England, especially near their Mouths or Out-lets, between the Mountains and higher Grounds on each Side, there are large Levels and Plains, which feem to have been originally Part of the Sea, raifed up, and atterrated by Earth and Silt brought down by those Ri-

vers in great Floods.

Strabo, in the First Book of his Geography, hath much to this purpose: Ἡ γὰρ πεόσχωσις περὶ αὐτὰ συνίςαται τὰ ςόματα τῶν ποταμῶν οἶον περὶ μὲν τὰ τἕ Ἰςρε τὰ λεγόμενα Στήθη, καὶ ἡ Σκυθίων ἐρημία · περὶ ἢ τὰ τε Φάσιδος ἡ Κολχικὴ παραλία, δίαμμος, καὶ ταπεινὴ, καὶ μαλαμὴ εσα · περὶ ἢ τὸν Θερμόδοντα καὶ τὸν Ἰριν όλη ἡ Θεμίσκυρα, τὸ τῶν ᾿Αμαζόνων πεδιὸν, καὶ τῆς Σιδύνης τὸ πλέον. Οὕτω ἢ καὶ ἐπὶ τῶν ἀλλων, ἀπαντες γὰρ μιμενται τὸν Νεῖλον, ἐξηπειρεντες τὸν πεὸ αὐτῶν πόεων, οἱ μὲν μᾶλλον, οἱ δ᾽ ἤττον · ἤττον μὲν οἱ μὴ πολλήν τε καὶ μαλακόγειον χώραν ἐπιόντες παὶ χειμάρρες δεχόμενοι πολλές · εν ἐςι καὶ ὁ Πύραμος, ὁ τῆ Κιλικία πολὺ μέρος πεοσθείς · ἐΦ᾽ εκ καὶ λόγιον ἐκπεπτωκέ τι τοιετον,

Έσσεται εσσομένοις ότε Πύραμος εὐρυοδίνης Ἡίονα περχέων Γερήν ες Κύπερν Γιμται.

And after a while, he adds, Οὖτω μὲν ἔν ἐνδέχεται πεσοχωσθῆναι τὸ πέλαγος πᾶν ἀπὸ τῶν αἰγιαλῶν ἀρξάμενον, αν συνεχεῖς έχη τὰς ἐν τῶν ποταμῶν ἐπιβρύσεις. That is, For this Landing up and Atteration of the Skirts of the Sea, is, for the most part, about the Mouths of Rivers, as about the Out-lets of Ister, the Places called Στήθη, and the Deserts of Scythia; about those of Phasis, the Sea-coast of Colchis, which is sandy.

sandy, and low, and soft; about Thermodon and Iris, all Themiscyra, the Plain of the Amazons, and the most Part of Sidene. And the like may be said of other Rivers. For all of them imitate the Nile, adding to the Continent or Main Land the Part lying before their Mouths, some more, some less; those less; that bring not down much Mud; and those more, that run a great way over soft and loose Ground, and receive many Torrents: Of which Kind is the River Pyramus, which hath added a great Part of its Land to Cilicia. Concerning which there is an Oracle come abroad. importing, That there will a Time come in future Ages, when the River Pyramus shall carry on the Shore and Land up the Sea as far as Cyprus..... So it might in Time happen, that the whole Sea should gradually be landed up, beginning from the Shores, if the Effusions of the Rivers, that is, the Earth and Mud they bring down, did spread so wide as to be continuous. Thus far Strabo. But the Oracle he mentions, predicting the Carrying on and Continuation of Cilicia as far as Cyprus, and the joining that Island to the Continent, proves false; there having not been as yet, that we hear or read of, any considerable Advance made towards it, in almost 2000 Years.

Now, the Rain thus continually washing away, and carrying down Earth from the Mountains and higher Grounds, and raising

up the Valleys near the Sea, as long as there is any Descent for the Rivers, so long will they continue to run, carry forward the low Ground, and streighten the Sea; which al-so by its Working, by reason of the Decli-vity, easily carries down the Earth towards the lower and middle Part of its Channel [Alveus,] and by Degrees may fill it up. Monsieur Loubere, in his late Voyage to Siam, takes Notice of the Increase of the Banks and Sands in and near the Mouths of the great Rivers of the Oriental Kingdoms, occasion'd by the Sediments brought down from the Countries by the feveral Streams; fo that, says he, the Navigation into and up those Rivers grows more and more difficult, and may in Process of Time be quite interrupted. The same Observation, I believe, may be made in most of our great European Rivers, wherein new Beds are rais'd, and old ones enlarged. Moreover, the Clouds still pouring down Rain upon the Earth, it will descend as far as there is any Declivity; and where that fails, it will stagnate, and, joining with the Sea, cover first the Skirts of the Earth, and so, by Degrees, higher and higher, till the whole be covered.

To this we may add, that some Assistance toward the leveling of the Mountains, may be contributed by the Courses and Catarracts of subterraneous Rivers washing away the Earth continually, and weakning their

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Foundations, so by Degrees causing them to founder, subside, and fall in. That the Mountains do daily diminish, and many of them sink; that the Valleys are raised; that the Skirts of the Sea are atterrated, no Man can deny. That these things must needs, in Process of Time, have a very considerable and great Effect, is as evident; which what else can it be, than that we have mentioned?

Moreover, towards this levelling of the Mountains, and filling up of the Sea, the Fire also contributes its Mite. For the burning Mountains or Vulcano's, as for Example, Ætna and Vesuvius, vomit at Times out of their Bowels, such prodigious Quantities of Sand and Ashes, and with that Force, that they are by the Winds carried and dispersed all over the Country, nay, transported over Seas into foreign and remote Regions; but let fall so copiously in the circumjacent Places, as to cover the Earth to a considerable Thickness; and not only so, but they also pour forth Floods of melted Stones, Minerals, and other Materials, that run down as low as the Sea, and fill up the Heavens, as of old one near Catana; and make Moles, and Promontories, or Points, as in the last Eruptions both of Ætna and Vesuvius; the Tops of these Mountains falling in, and subsiding proportionably to the Quantity of the ejected Matter, as Borellus proves. Meeting with a Quotation in Dr. Hakewill's Apology out of A 2 2

Josephus Blancanus his Book De Mundi Fa-brica, I earnestly desired to get a Sight of that Book, but could not procure it till the Copy of this Discourse was out of my Hands, and sent up to London, in order to its Printing. But then obtaining it, I found it so exactly consonant to my own Thoughts, and to what I have here written concerning that Subject; and some Particulars occurring therein by me omitted, that I could not forbear translating the whole Discourse into English, and annexing it to this Chapter, especially because the Book is not commonly to be met with. The Discourse is first set down in his Book De locis Mathematicis Aristotelis more at large, and afterward repeated in his Book De Mun-

di Fabrica more briefly.

PERGRATUM Lectori fore existimavi, si rem scitu dignissimam exposuero, &c. I thought it might be very acceptable to the Reader, if I should discover to him a thing most worthy to be known; which I have long ago, and for a long time observed, and am daily more confirmed in; especially, seeing no former Writer that I know of hath published any thing concerning it. It is this, That the Superficies of the whole Earth, which is now rough and uneaven by reason of Mountains and Valleys, and so only rudely Spherical, is daily from the very Beginning of the World reducing to a perfect Roundness, infomuch that it will necessarily come to pass

pass in a Natural way, that it be one Day overflown by the Sea, and rendred unhabitable.

FIRST then, that we may clearly apprehend the Causes of this Thing, we must lay down as a Foundation from Holy Writ, That the Terraqueous Globe was, in the Beginning, endued with a more perfect spherical Figure, that is, without any Inequalities of Mountains and Valleys; and that it was wholly covered with the Sea, and fo altogether unfit for terrestrial Animals to inhabit: But it was then rendred habitable, when by the Beck or Command of its Creator, the greatest Part of the Land was translated from one Place to another; whereupon here appeared the Hollows of the Seas, there the Heights of the Mountains: And all the Waters, which before covered the Face of the whole Earth, receded, and flowing down, filled those depressed and hollow Places; and this Congregation of Waters was called the Sea. Hence some grave Authors doubt not to affert, That the Mountains were made up of that very Earth which before filled the Cavities of the Sea. Whence it follows, that the Earth, as now it is, is mountainous and elevated above the Waters, hath not its natural Figure, but is in a violent State: but Nullum violentum est perpetuum. Besides, the Earth being heavier than the Water, none of its Parts ought to be extant, and ap-Aa 3 pear pear above its Superficies; and yet we fee that the Earth is really higher than the Sea, especially the mountainous Parts of it: In which respect also, both Land and Water are in a violent State. Wherefore, it is very convenient to the Nature of both, that they should daily return towards their ancient and primigenial State and Figure; and, accordingly, we affirm that they do so.

Moreover, we fay, that the Waters, both of Rains and Rivers, are the Cause of this Restitution, as will appear by the following

Observations.

1. We see that Rivers do daily fret, and undermine the Roots of the Mountains; so that here and there, from most Mountains, they cause great Ruins and Precipices, whence the Mountains appear broken; and the Earth, so fallen from the Mountains, the Rivers carry down to the lower Places.

FROM these Corrosions of the Rivers, proceed those slow, but great Ruins, called, Labina, à labendo; in which some Streets and whole Villages are precipitated into the

Rivers.

2. We daily see, that the Rain-Waters wash away the Superficies of the Mountains, and carry them down to the lower Places. Hence it comes to pass, that the higher Mountains are also harder and more stony than the rest, by means whereof they better resist the Water. Hence also it comes to pass,

that

that ancient Buildings in Mountains, their Foundations being by Degrees discovered, prove not very durable. For which Reason, the Foundations of the Roman Capitol are now wholly extant above-ground; which of old, at its first Erection, were sunk very deep into it. This same thing all the Inhabitants of the Mountains do confirm; all faying, that this Lowering of Mountains was long fince known to them; for that, formerly, fome intermediate Mountains intercepted the Sight of a Castle, or Tower, situate in a more remote Mountain; which, after many Years, the intervenient Mountain being depressed, came clearly into View. And George Agricola is of Opinion (which I very much approve of) that the Rivers produced the Mountains and Hills in this manner. In the Beginning of the World, there were not so many particular divided Mountains, but only perpetual eminent Ridges of Land, not dissected into fo many Valleys as we now fee. So, for Example, our Appennine was at first one continued, eaven, eminent Ridge of Land, not divided into any particular Mountains and Hills by intervening Valleys, as now it is; but that after the Rivers began to flow down from the Top of it, by little and little fretting and corroding the Ground, they made Valleys, and daily more and more; and by this means the whole Appennine came to be divided into many Hills and Mountains.

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happens; for the Plains are daily more and more elevated, because the Waters do let fall, in the plain and hollow Places, the Earth they brought down with them from the Mountains. Hence we see that ancient Buildings in such Places, are almost wholly buried in the Ground. So in Rome, at the Foot of the Capitoline Mountain, we see the Triumphal Arch of Septimius almost wholly overwhelmed in the Earth; and every where in ancient Cities, many Gates and Doors of Houses almost landed up, little thereof being extant above Ground.

FROM which it appears, that this Sinking and Demersion of Buildings into the Earth is a manifest Sign of their Antiquity, which is fo much the greater, by how much the deeper they are funk. So, for Example, at Bonomia in Italy, many of the ancient Gates of the City, which the Bolognese call Torresotti, are very deeply funk, which is a certain Argument of their Antiquity; and thence it appears to be true that Histories relate, that they were built in the Time of S. Petronius, about 1200 Years ago. But here it is to be noted, that other things agreeing, those are deeper depressed that are built in lower Places, than those in higher, for the Reason abovesaid. So at Bononia, that old Port, called Il Torresotto di S. Georgio, is deeplier buried, or landed up, than that which is cal-

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led Il Torresotto di Stra Castilione, because that is situated in a lower Place, and therefore the Earth is more easily raised up about it.

- 4. THE same is affirmed by Architects, who, when they dig their Foundations, do every where, in plain Places, first of all remove the Earth, which they call Commota, [loofe or shaken] which is mixt with Fragments of Wood, Iron, Rubbish, Coins, ancient Urns, and other things; which when it is thrown out, they come to another fort of Earth that hath never been stirred, but is folid, compact, and not mixt with any heterogeneous thing, especially artificial. That moved [Commota] and impure Earth, is it which the Waters have by little and little brought down from the higher to the more depressed Places, which is not every where of equal Depth. But now, because in the Mountains there is no where found fuch moved or new Earth, as is plain from the Experience of Architects, it is manifest that the Mountains do by no means grow or increase, as some dream.
- 5. Our Observation is proved from that Art, which is now much practised, of elevating and landing up depressed Places by the Waters of Rivers, and depressing the higher by running the Water over them.

THE same things happen about the Sea; for, whereas the Bottom of the Sea is more

depressed than the Superficies of the Earth; and all the great Rivers empty themselves into the Sea, and bring in with them a great Quantity of Earth and Sand, there must needs be great Banks or Floors of Earth raised up about the Sea Shores, near the Mouths of Rivers, whereby the Shores must necessarily be much promoted and carried forward into the Sea, and so gain upon it, and compell it to recede.

This may be proved, first by the Authority of Aristotle, lib. i. Meteor. cap. De permutatione terræ ac maris; and that of the ancient Geographers and Historians. To omit that Proof from Egypt; Aristotle's second Example of this Landing up of the Sea, is the Region of Ammonia, whose Lower and Maritime Places (faith he) it's clear, were by this Landing up first made Pools and Fens, and in Process of time these Pools were dryed up, and raised to be firm Land, by Earth brought down. A third Example is that of the Maotis Palus, whose Skirts are so grown up by what the Rivers bring down, that the Waters will not carry any thing so great as Ships, as they would have done fixty Years ago. A fourth is the Thracian Bosphorus, which for Brevity's-sake may be seen in him. Add hereto, in the fifth Place, the Testimony of Pliny, who tells us, that much new Land hath been added to the Earth, not only brought

brought in by the Rivers, but deserted by the Sea.

So the Sea hath receded ten Miles from the Port of Ambracia, and five from that of Athens, and in several other Places more or less. What he adds out of Strabo, concerning the River Pyramus, is already enter'd.

6. NEITHER are later and nearer Experiments wanting. Of old time Ravenna stood upon the Brink of the Sea Shore, which is now by reason of the Landing up the Shallows far distant from it. The Sea washed the Walls of Padua, which is now Twenty five Miles remote therefrom. In fine, our Rhene of Bologna, though it be but a small Torrent, yet in a few Years, fince it hath been by an artificial Cut let into the Po, it hath so filled it up, and obstructed its Channel with Sand and Mud, that it hath much endamaged the neighbouring Fields. Seeing then by these various Aggerations of Sand and Silt, the Sea is daily cut short, and driven back, and its Basin or Receptacle straitned, and the Bottom thereof raised, it will necessarily come to pass in time, that it will begin to overflow; as now it happens in many Places, for Example, in the Baltick, Danick, and Holland Shores, in which Places they are forced to erect and maintain long and high Banks and Fences against the Inundations of the Sea.

THEREFORE, after this manner, that Earth which now makes up the Mountains, being

by the Water little by little brought down into the Cavities of the Sea, is the Cause why the Sea gradually here and there overflows the Superficies of the Earth; and so the Globe of the Earth, by the Assusion of the Waters, will be again render'd unhabitable, as at first it was in the Beginning of the World; and the Earth and Water will return to their primitive State and Figure, in which they

ought naturally to rest.

HENCE we may deduce some Consectaries worthy to be known, viz. That the World, or at least the Earth, was not endued with that Figure which we now fee; neither can the World endure for ever. For if this mountainous Figure had been in it from Eternity, all those Protuberancies of the Mountains had been long fince eaten away and wasted, or confumed by the Waters. Nor can this World be Eternal; because, as we have proved, in Process of time it will be reduced to a perfect Rotundity, and be overflown by the Sea; whereupon it will become unhabitable, and Mankind must necessarily perish. Wherefore, unless that Deluge were prevented by the Fire which the Holy Scriptures mention, the World would nevertheless be destroyed by Water. Long after I had committed these things to writing, I met with Philo Judaus his Book De Mundo, wherein he touches this Matter but obscurely, and in a very few Words.

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Thus far Blancanus, whose Sentiments and Observations concerning this Matter thus punctually concurring, and according with mine, to my great Wonder and Satisfaction, I could not but think that the Conclusion hath a high Degree of Probability. Only he takes no Notice, that in Compensation of what the Rivers gain from the Sea about their Outlets, the Sea may gain from the Land by undermining and washing away the Shores that are not rocky, (as we fee it doth in our own Country) perhaps as much as it loses, according to the vulgar Proverb before remember'd. However, all contributes towards the filling up of the Sea, and bringing on an Inundation, as I shall afterwards shew.

But it may be objected, That if the Waters will thus naturally and necessarily in Process of time again overslow and cover the Earth, how can God's Promise and Covenant be made good, Gen. ix. 11. That there should not any more be a Flood to destroy the Earth.

To which I answer, 1. That though this would follow in a natural way, yet the Power of God may interpose to prevent it, and so make good His Promise. 2. Though it might come to pass in the Course of Nature, yet would it be after so many Ages, that it is not at all likely the World should last so long; but the Consagration or Destruction

of it by Fire, predicted by the Scriptures, will certainly prevent it. 3. Possibly there may be something in Nature which may obviate this Event, though to us at present unknown, which I am the more inclinable to believe, because the Earth doth not hasten so fast towards it, as some of the Ancients imagined, and as the Activity of such Causes might seem to require, as I have already intimated.

Varenius, in his Geography, putting the Question, Whether the Ocean may again come to cover all the Earth, and make an universal Deluge? answers, That we may conceive a way how this may naturally come to pass. The Manner thus; Supposing that the Sea by its continual Working doth undermine and wash away the Shores and Cliffs that are not rocky, and carry the Earth thereof down towards the Middle, or deepest Parts of its Channel, and so by Degrees fill it up. By doing this perpetually, it may, in a long Succession of Time, carry all away, and itself cover the whole Earth. That it doth thus subvert and wash away the Shores in many Places, is in Experience true. About Dort in Holland, and Dullart in Friesland, and in Zealand many Villages, some fay Three hundred, have been drown'd by the Encroachments of the Sea, as some of their Towers and Steeples still extant above the Waters do testify. On the Tuscan Shore, Kircher

Kircher tells us, That not far from Ligorn, he himself had observed a whole City under Water, that had been in former Times drown'd by the Inundation of the Sea. And overagainst Puteoli, in the Sinus of Baia, he tells us, That in the Bottom of the Sea, there are not only Houses but the Traces and Footsteps of the Streets of some City manifestly discernible. And in the County of Suffolk, almost the whole Town of Donewich, with the adjacent Lands, hath been

undermined and devoured by the Sea.

THIS Washing away of the Shores is, I conceive, in great Measure to be attributed to the forementioned streightning and cutting short of the Sea, by the Earth and Silt that in the Times of Floods are brought down into it by the Rivers. For the Vulgar have a Proverbial Tradition, That what the Sea loses in one Place, it gains in another. And both together do very handsomly make out and explain, how the Earth in a Natural way, may be reduced to its primitive State in the Creation, when the Waters covered the Land. But this, according to the lei-furely Proceedings of Nature, would not come to pass in many Ages, I might say, in Ages of Ages: Nay, some think, that those vast Ridges and Chains of Mountains, which run through the Middle of the Continents, are by reason of their great Height, Weight and Solidity, too great a Morfel ever to be

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devoured by the Jaws of the Sea. But whe I ther they be or not, I need not dispute, though I incline to the Negative, because this is not the Dissolution the Apostle here

fpeaks of, which must be by Fire.

BUT I must not here dissemble an Objection I see may be made, and that is, That the Superficies of the Earth is so far from being depressed, that it is continually elevated. For in ancient Buildings, we see the Earth raised high above the Foot of them. So the Pantheon at Rome, which was at first ascended up to by many [eight] Steps, is now descended down to by as many. The Basis and whole Pedestal of Trajan's Pillar there was buried in the Earth.

DR. Tancred Robinson, in the Year 1683. observed in some Places the Walls of old Rome to lie Thirty and Forty Foot under Ground; fo that he thinks the greater Part of the Remains of that famous ancient City is still buried, and undiscovered; the prodigious Heaps of Ruins and Rubbilh inclosed within the Vineyards and Gardens, being not half digged up or searched, as they might be, the Tops of Pillars peeping up and down. And in our own Country we find many ancient Roman Pavements at some Depth under Ground. My learned and ingenious Friend Mr. Edward Lbwyd, not long fince inform'd of one, that himself had seen buried deep in the Churchyard at Wychester in Glocestershire. Nay, the Earth in time will grow over and bury the Bodies of great Timber Trees, that have been fallen, and lie long upon it; which is made one great Reason, that such great Numbers (even whole Woods) of subterraneous Trees are frequently met with, and dug up at vast Depths in the Spanish and Dutch Netherlands, as well as in many Places of this Island of Great Britain.

To which I answer, as to Buildings, 1. The Ruins and Rubbish of the Cities wherein they stood, might be conceived to bury them as deep as they now lie under Ground. And by this means it's likely the Roman Pavements we find, might come to be covered to that Height we mentioned. For that the Places where they occurr, were anciently Roman Towns subverted and ruined, may easily be proved; as particularly in this we mention'd, from the Termination Chester; whatever Town or Village hath that Addition to its Name, having been anciently a Roman Town or Camp, Chester seeming to be nothing but Castra.

2. It is to be consider'd, That weighty Buildings do in time overcome the Resistance of the Foundation, unless it be a solid Rock;

and fink into the Ground:

NAY, the very foft Water, lying long upon the Bottoms of the Sea or Pools, doth so compress and sadden them by its Weight,

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that the very Roads that are continually beaten with Horses and Carriages, are not fo firm and fad: And in the Sea, the nearer you dig to the low Water-Mark, still the sadder and firmer it is: And it's probable, still the farther the fadder; which feems to be confirmed by the strong fixing of Anchors. This Firmness of the Sand, by the Weight of the incumbent Water, the People inhabiting near the Sea are so sensible of that I have feen them boldly ride through the Water cross a Channel three Miles broad, before the Tide was out, when in some Places it reach'd to the Horses Belly.] A Refemblance whereof we have in Ponds, which being newly digg'd, the Water that runs into them, finks foon into the Earth, and they become dry again; till after fome time, by often filling, the Earth becomes fo folid, through the Weight of the Water, that they leak no more, but hold Water was to the Prink. Wittie Seaborough Stages up to the Brink. Wittie Scarborough Spaw, p. 86.

WHAT Force a gentle, if continual Preffure hath, we may understand also by the Roots of Trees, which we see will sometimes pierce through the Chinks of Stone Walls, and in time make great Cracks and Rifts in them; nay, will get under their very Foundations. The tender Roots of Herbs overcome the Resistance of the Ground, and make their way through Clay or Gravel. By the

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by, we may here take Notice, that one read fon why Plowing, Harrowing, Sifting, or any Comminution of the Earth, renders it more fruitful, is, because the Roots of Grass, Corn, and other Herbs can, with more Facility, creep abroad, and multiply their Fibres in

the light and loofe Earth.

THAT the Rotting of the Grafs, and other Herbs upon the Ground, may in some Places raise the Superficies of it, I will not deny; that is, in Gardens and Enclosures, where the Ground is rank, and no Cattel are admitted , to eat off the Fog or long Grass; but elsewhere, the Raising of the Superficies of the Earth is very little and inconsiderable; and none at all, unless in level Grounds, which have but little Declivity: For otherwise the Soil would by this time have come to be of a very great Depth, which we find to be but shallow. Nor do I think, that so much as the Trunks of fallen Trees are by this means cover'd; but rather, that they fink by their own Weight, in time overcoming the Refistance of the Earth, which without much Difficulty yields, being foaked and foftned by the Rains infinuating into it, and keeping it continually moist in Winter-time. But if these Buildings be situate in Valleys, it is clear, that the Earth brought down from the Mountains by Rain, may serve to land them up. Again, the Superficies of the Earth may be raifed near the Sea Coast, by the B b 2

continual Blowing up of Sand by the Winds? This happens often in Norfolk, and in Cornwall, where I observed a fair Church, viz. that of the Parish called Lalant, which is the Mother Church to S. Ives, and above two Miles distant from the Sea, almost covered with the Sand; little being extant above it, but the Steeple and Ridge of the Roof. Nay, a great Part of S. Fves itself lies buried in the Sand: And I was told there, that in one Night there had been a whole Street of Houfes so covered with Sand, that in the Morning they were fain to dig their way out of their Houses through it. All along the Western Shore of Wales, there are great Hills of Sand thus blown up by the Wind. We observed also upon the Coast of Flanders and Holland, the like fandy Hills, or Downs, from which Westerly Winds drive the Sand a great way into the Country. But there are not many Places liable to this Accident, viz. where the Bottom of the Sea is fandy, and where the Wind most frequently blows from off the Sea; where the Wind sets from the Land toward the Sea this happens not; where it is indifferent, it must in reason carry off as much as it brings on, unless other Causes hinder.



## SECT. II.

The Second possible Cause of the World's Destruction in a Natural Way, the Extinction of the Sun.

II. WHE Possibility of the Sun's Ex-To tinction: Of which Accident I shall give an Account of Dr. More's Words, in the last Chapter of his Treatise of the Immortality of the Soul. 'This (faith he) though it may feem a Panick Fear at first Sight; yet if the Matf ter be throughly examined, there will appear no contemptible Reasons that may induce Men to suspect, that it may at last fall out, there having been at certain Times fuch near Offers in Nature towards this fad Accident already." Pliny speaks of it as a thing not unfrequent, that there should be Prodigiosi & longiores Solis defectus, qualis occiso Dictatore Cæsare, & Antoniano bello, totius anni pallore continuo, Hist. Nat. lib. 2. cap. 30. Prodigious and lasting Defects of the Sun, such as happened when Exfar the Dictator was slain, and in the War with Anthony, when it was continually pale and gloomy for a whole Year. The like happened in Justinian's Time, as Cedrenus writes; when for a whole Year together, the Sun was of a very dim and duskish Hue, as if B b 3

he had been in a perpetual Eclipse: And in the Time of Irene the Empress, it was so dark for Seventeen Days together, that the Ships lost their Way in the Sea, and were ready to run one against another, as Theophanes reports. But the late accurate Difcovery of the Spots of the Sun by Scheiner, and the Appearing and Disappearing of Fixt Stars and Comets, and the Excursions of these last, do argue it more than possible, that after some vast Periods of Time, the Sun may be fo inextricably inveloped by the Macule, that he may quite lose his Light; and then you may easily guess what would become of the Inhabitants of the Earth: For without his vivifick Heat, neither could the Earth put forth any Vegetables for their Sustenance; neither if it could, would they be able to bear the Extremity of the Cold, which must needs be more rigorous, and that perpetually, than it is now under the Poles in Winter-time. But this Accident, tho' it would indeed extinguish all Life, yet being quite contrary to a Dissolution by Fire, of which the Apostle speaks, I shall pass it over without farther Confideration, and proceed to a Third,



## SECT. III.

The Third possible Cause of the World's Destruction, the Eruption of the Central Fire.

HE Possibility of the Eruption of the Central Fire, if any such there be, inclosed in the Earth. It is the Hypothe-

fis of Monsieur des Cartes, that the Earth was originally a Star, or Globe of Fire like the Sun, or one of the Fixt Stars, situate in the Center of a Vortex continually whirling round with it. That by Degrees it was covered over, or incrustated with Macula, arising on its Surface like the Scum on a boiling Por, which still increasing and growing thicker and thicker, the Star losing its Light and Activity, and, consequently, the Motion of the celestial Vortex about it growing more weak, languid, and unable to relift the vigorous Incroachments of the neighbouring Vortex of the Sun; it was at last drawn in, and wholly absorpt by it, and forced to com-ply with its Motion, and make one in the Quire of the Sun's Satellites. This whole Hypothesis I do utterly disallow and reject. Neither did the Author himself (if we may believe him) think it true, that the Earth was thus generated. For he faith, Quinimo B b 4 ad

ad res naturales melius explicandas, earum causas altius hic repetam quam ipsas unquam extitisse existimem. Non enim dubium est. quin mundus ab initio fuerit creatus cum omni sua perfectione, ità ut in eo & Sol, & Terra, & Luna, & Stella extiterint..... Hoc fides Christiana nos docet; hocque etiam ratio naturalis planè persuadet. Attendendo enim ad immensam Dei potentiam, non possumus existimare illum unquam quidquam fecisse, quod non omnibus suis numeris fuerit absolutum: That is, Moreover, for the better explicating of Natural Things, I shall bring them from higher or more remote Causes than I think they ever had. For there is no doubt, but the World was originally created in its full Perfection, so that in it were contained both Sun, and Moon, and Earth, and Stars, &c. For this the Christian Faith teacheth us, and this also Natural Reason doth plainly persuade; for attending to the immense Power of God, we cannot think that He ever made any thing that was not complete in all Points. But tho' he did not believe that the Earth was generated, or formed according to his Hypothesis, yet surely he was of Opinion, that it is at prefent fuch a Body as he represented it after its perfect Formation, viz. with a Fire in the middle, and so many several Crusts or Coats inclosing it; else would he have given us a meer Figment or Romance instead of a Body of Philosophy.

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Bur tho' I do reject the Hypothesis; yet the Being of a Central Fire in the Earth is not. so far as I understand, any way repugnant to Reason or Scripture. For first of all, the Scripture represents Hell as a Lake of Fire, Mark ix. 43, 44, &c. Rev. xx. 10, 14, 15. and, likewise, as a low Place beneath the Earth. So Psal. Ixxxvi. 13. and Deut. xxxii. 22. it is called the nethermost Hell, Prov. xv. 24. The Way of Life is above to the Wife, that be may depart from Hell beneath. 2. Many of the Ancients understand that Article of the Creed, He descended into Hell, of our Saviour's Descent into that local Hell beneath the Earth, where He triumphed over the Devil, and all the Powers of Darkness. And, particularly, Irenaus interprets that Saying of our Saviour, That the Son of Man should be three Days in the Heart of the Earth, of his being three Days in the Middle of the Earth, which could not be meant (faith he) of the Sepulchre, because that was hewn out of a Rock in its Superficies. 3. It is a received Opinion among the Divines of the Church of Rome, that Hell is about the Center of the Earth; infomuch as fome of them have been folicitous to demonstrate, that there is room enough to receive all the Damned, by giving us the Dimensions thereof.

NEITHER is it repugnant to the History of the Creation in Genefis. For the indeed Mofes doth mention only Water and Earth, as the Component Parts of this Body; yet doth he not affert, that the Earth is a simple, uniform, homogeneous Body; as neither do we, when we fay, Upon the Face of the Earth, or the like. For the Earth, we see, is a Mass made up of a Multitude of different Species of Bodies, Metals, Minerals, Stones, and other Fossils, Sand, Clay, Marl, Chalk, &c. which do all agree, in that they are confistent and folid more or less, and are in that respect contradistinguished to Water; and together compound one Mass, which we call Earth. Whether the interior Parts of the Earth be made up of so great a Variety of different Bodies, is to us altogether unknown. For tho' it be observed by Colliers, that the Beds of Coals lie one way, and do always dip towards the East, let them go never so deep; so that, would it quit Cost, and were it not for the Water, they say, they might pursue the Bed of Coals to the very Center of the Earth, the Coals never failing or coming, to an End that way; yet that is but a rash and ungrounded Conjecture. For, what is the Depth of the profoundest Mines, were they a Mile deep, to the Semidiameter of the Earth? not as One to Four thousand. Comparing this Observation of Dipping with my Notes about other Mines, I find that the Veins or Beds of all generally run East and West, and dip towards the East. Of which, what Account or Reason can we give, but the

the Motion of the Earth from West to East? I know some say, that the Veins, for Example, of Tin and Silver, dip to the North, tho' they confess they run East and West, which is a thing I cannot understand, the Veins of those Metals being narrow things. Sir Tho. Willoughby, in his forementioned Letter, writes thus: ---- 'I have talked with some of my Colliers about the Lying of the Coal, and find, that generally the Basfet-End (as they call it) lies West, and runs deeper toward the East, allowing about 'twenty Yards in Length to gain one in Depth; but sometimes they decline a little from this Posture; for mine lie almost South-West, and North-East. They always fink to the East more or less. There may, therefore, for ought we know, be Fire about the Center of the Earth, as well as any other Body, if it can find a *Pabulum*, or Fewel there to s maintain it. And why may it not? fince the Fires in those subterraneous Caverns of Ætna, Vesuvius, Stromboli, Heela, and other burning Mountains or Vulcano's, have found wherewith to feed them for Thousands of SYears. And as there are at some, tho' uncertain Periods of Time, violent Eruptions of Fire from the Craters of those Mountains, f and mighty Streams of melted Materials s poured forth from thence: So, why may on not this Central Fire in the Earth, (if any fuch there be) receiving accidentally extra-6 ordinary

ordinary Supplies of convenient Fuel, either from some inflamable Matter within or from without, rend the thick exterior Cortex which imprisons it, or finding some Vents and Issues, break forth and overflow the whole Superficies of the Earth, and burn up all Things." This is not impossible; and we have seen some Phanomena in Nature which bid fair towards a Probability of it. For, what should be the Reason of new Stars appearing and disappearing again? as that noted one in Cassiopeia, which at first shone with as great a Lustre as Venus, and then by Degrees diminishing, after some two Years vanish'd quite away? But that by great Supplies of combustible Matter, the internal Fire fuddenly increasing in Quantity and Force, either found, or made its Way through the Cracks or Vents of the Macula which inclosed it, and in an instant, as it were, overflowed the whole Surface of the Star, whence proceeded that illustrious Light; which afterwards again gradually decayed, its Supply failing. Whereas other newly appearing Stars, which either have a constant Supply of Matter, or where the Fire hath quite dissolved the Macula, and made them comply with its Motion, have endured for a long time, as that which now shines in the Neck of Cygnus, which appears and disappears at certain Intervals.

But because it is not demonstrable that there is any such Central Fire in the Earth, I propose the Eruption thereof rather as a possible than probable Means of a Constagration: And proceed to the last Means whereby it may naturally be effected; and that is:

## SECT. IV.

The Fourth Natural Cause of the World's Dissolution, the Earth's Dryness and Instammability.

IV. HE Dryness and Instammability of the Earth under the Torrid Zone, with the Eruption of the Vulcano's to set it on fire. Those that hold the Inclination of the Equator to the Ecliptick daily to diminish, so that after the Revolutions of some Ages they will jump and consent, tell us, that the Sun-Beams lying perpendicularly and constantly on the Parts under the Equator, the Ground thereabout must needs be extremely parch'd and rendred apt for Instammation. But for my part, I own no such Decrement of Inclination. And the best Mathematicians of our Age deny, that there hath been any since the

eldest Observations that are come down to us. For tho', indeed, Ptolemy and Hipparchus do make it more than we find it by above twenty Minutes, yet that Difference is not

fo considerable, but that it may well be im? puted to the Difference of Instruments, or Observations in Point of Exactness. So that not having decreased for Eighteen hundred Years past, there is not the least ground for Conjecture, that it will alter in Eighteen hundred Years to come, should the World last so long. And yet if there were such a Diminution, it would not conduce much (so far as I can see) to the bringing on of a Con-flagration. For tho' the Earth would be extremely dried, and perchance thereby rendred more inflammable; yet the Air being by the same Heat as much rarified, would contain but few nitrous Particles, and so be inept to maintain the Fire, which, we see, cannot live without them: It being much deaded by the Sun shining upon it; and burning very remisly in Summer-time, and hot Weather. For this Reason, in Southern Countries, in extraordinary hot Seasons, the Air scarce sufficeth for Respiration. To the clearing up of this, let us a little consider what Fire is. It feems to confift of three different. Sorts of Parts. 1. An extremely thin and fubtil Body, whose Particles are in a very vehement and rapid Motion. 2. A (supposed) Nitrous Pabulum, or Fewel, which it receives from the Air. 3. A sulphureous or unctuous Pabulum, which it acts and preys upon, passing generally by the Name of Fewel. This forementioned subtil Body agitaagitating the (supposed) Nitrous Particles it receives from the Air, doth by their Help, as by Wedges, to use that rude Similitude, penetrate the unctuous Bodies, upon which it acts, and divide them into their immediate component Particles, and at length, perchance into their first Principles; which Operation is called the Chymical Anatomy of mix'd Bodies. So we see Wood, for Example, divided by Fire into Spirit, Oil, Water, Salt, and Earth.

THAT Fire cannot live without those Particles it receives from the Air, is manifest, in that, if you preclude the Access of all Air, it is extinguished immediately: And in that, where and when the Air is more charged with them, as in cold Countries, and cold Weather, the Fire rages most: That likewise it cannot be continued without an unctuous Pabulum, or Fewel, I appeal to the Experience of all Men.

Now then, in the rarified Air in the Torrid Zone, the nitrous Particles being proportionably scattered and thin set, the Fire that might be kindled there would burn but very languidly and remisly, as we said just now: And so the Eruptions of Vulcano's, if any such happened, would not be like to do half the Execution there that they would do in cold Countries. And yet I never read of any spreading Consagration caused by the Eruptions of any Vulcano's, either in hot Countries.

tries, or in cold. They usually cast out abundance of thick Smoak, like Clouds darkning the Air; and likewise Ashes and Stones, sometimes of a vast Bigness; and some of them, as Vesuvius, Floods of Water; others, (as Ætna) Rivers of melted Materials, running down many Miles: As for the Flames that issue out of their Mouths at such Times, they are but transient, and mounting up-

wards, feldom fet any thing on fire.

But not to infift upon this, I do affirm? that there hath not as yet been, nor for the future can be, any such Drying or Parching of the Earth under the Torrid Zone, as some may imagine. That there hath not yet been, I appeal to Experience, the Countries lying under the Course of the Sun, being at this Day as fertile as ever they were, and wanting no more Moisture now than of old they did; having as constant and plentiful Rains in their Seasons as they then had. That they shall for the future fuffer any more Drought than they have heretofore done, there is no Reafon to believe or imagine; the Face of the Earth being not altered, nor naturally alterable, as to the main, more at prefent than it was heretofore. I shall now add the Reafon, why, I think, there can be no fuch Exficcation of the Earth in those Parts: It's true indeed, were there nothing to hinder them, the Vapours exhaled by the Sun-Beams in those hot Regions, would be

cast off to the North, and to the South, a great way, and not fall down in Rain there, but towards the Poles: But the long and continued Ridges or Chains of exceeding high Mountains are so disposed by the great and wife Creator of the World, as, at least in our Continent, to run East and West, as Gassendus in the Life of Peireskius well observes. fuch are Atlas, Taurus, and the Alps, to name no more: They are, I fay, thus dispofed, as if it were on purpose to obviate and stop the Evagation of the Vapours Northward, and reflect them back again, so that they must needs be condensed, and fall upon the Countries out of which they were elevated. And on the South Side, being near the Sea, it is likely that the Wind, blowing for the most part from thence, hinders their Ex-cursion that way. This I speak by Presun-ption, because in our Country, for at least three Quarters of the Year, the Wind blows from the great Atlantick Ocean; which was taken Notice of by Julius Casar in the Fifth of his Commentaries, De Bello Gallico. Corus ventus, qui magnam partem omnis temporis in his locis flare consuevit.

As for any Deficcation of the Sea, I hold that by meer natural Causes to be impossible, unless we could suppose a Transmutation of Principles or Simple Bodies, which for Reassons alledged in a former Discourse I cannot allow. I was then, and am still of Opinion,

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that God Almighty did at first create a cer-tain and determinate Number of Principles, or variously figured Corpuscles, intransmutable by the Force of any natural Agent, even Fire itself, (which can only separate the Parts of heterogeneous Bodies) yet not an equal Number of each Kind of these Principles, but of some abundantly more, as of Water, Earth, Air, Æther; and of others fewer, as of Oyl, Salt, Metals, Minerals, &c. Now, that there may be some Bodies indivisible by Fire, is, I think, demonstrable. For how doth or can Fire be conceived to divide, one can hardly imagine any other way than by its small Parts, by reason of their violent Agitation infinuating themselves into Compound Bodies, and separating their Parts; which allowing, yet still there is a Term of Magnitude, below which it cannot divide, viz. it cannot divide a Body into smaller Parts than those whereof itself is compounded. For taking, suppose, one least Part of Fire, 'tis clear that it cannot infinuate itself into a Body as little or less than itself; and what is true of one, is true of all: I fay, we can imagine no other way than this, unless perchance, by a violent Stroke or Shock, the Parts of the Body to be divided, may be put into so impetuous a Motion, as to fall in sunder of themselves into lesser Particles than those of the impellent Body are, which I will not suppose at present. Now, it is possible, that

that the Principles of some other Simple Bodies may be as small as the Particles of Fire. But however that be, it is enough, if the Principles of Simple Bodies be, by reason of their perfect Solidity, naturally indivisible. Such a fimple Body, I suppose, Water separated from all heterogeneous Mixtures to be: And consequently the same Quantity thereof that was at first created, doth still remain, and will continue always in Despight of all natural Agents, unless it pleases the Omnipotent Creator to dissolve it. And therefore there can be no Desiccation of the Seas, unless by turn-ing all its Water into Vapour, and suspending it in the Air, which to do, what an immense and long-continuing Fire would be requisite? to the Maintenance whereof all the inflammable Materials near the Superficies of the Earth would not afford Fewel enough. The Sun, we see, is so far from doing it, that it hath not made one Step towards it these four thousand Years, there being in all Likelihood as great a Quantity of Water in the Ocean now, as was immediately after the Flood: And consequently there would probably remain as much in it, should the World last four thousand Years longer.

This Fixedness and Intransmutability of Principles secures the Universe from Dissolution by the prevailing of one Element over another, and turning it into its own Nature; which otherwise it would be in continual

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# Of the Dissolution

Danger of. It secures likewise the Perpetuity of all the Species in the World, many of which, if their Principles were transmutable, might by such a Change be quite lost: And lastly, bars the Production or Creation of any new Species, as in the formentioned Treatise I have shewn.

### CHAP. VI.

Containing an Answer to the Second Queftion, Whether shall this Dissolution be effected by natural or by extraordinary Means, and what they shall be?

S to the Second Question, Whether shall this Dissolution be brought about and effected by natural or by extraordinary Means and

Instruments, and what those Means and Instruments shall be? I answer in brief, That the Instrumental Efficient of this Dissolution shall be natural. For it is clear, both by Scripture and Tradition, and agreed on all hands, that it shall be that Catholick Dissolution, Fire. Now, to the Being and Maintenance of Fire, there are four Things requisite. 1. The active Principle of Æther. 2. Air,

or a Nitrous Pabulum received from it: These two being commixt together, are every where at hand. 3. Fewel, which, considering the Abundance of combustible Materials, which are to be found in all Places upon or under the Surface of the Earth, can no where be wanting. 4. The Accension, and the sudden and equal Dissusion of this Fire all the World over. And this must be the Work of God, extraordinary and miraculous.

Such a Dissolution of the World might indeed be effected by that natural Accident mentioned in the Answer to the precedent Question, wiz. The Eruption of the Central Fire. But because it is doubtful, whether there be any fuch Fire in the Middle of the Earth or no; and if there ever were, it is hard to give an Account, how it could be maintained in that infernal Dungeon for want of Air and Fewel. And, because, if it should break forth into the Consistency of a thin Flame, it would in all Likelihood speedily like Lightning mount up to Heaven, and quite vanish away; unless we could suppose Floods, nay Seas of melted Materials, or liquid Fire, enough to overflow the whole Earth, to be poured forth of those Caverns. For these Reasons I reject that Opinion, and do rather think that the Conflagration shall be effected by a superficial Fire. Tho' I must confess we read in Tacitus, Annal. 13. at the Cc3. End,

# Of the Dissolution.

End, of a Sort of Fire that was not so apt to disperse and vanish. '---- The City of the Inhonians in Germany (faith he) confederate with us was afflicted with a sudden Difaster; for Fires issuing out of the Earth, burned Towns, Fields, Villages every where, and spread even to the Walls of a Colony newly built, and could not be exringuished, neither by Rain nor River-Water, nor any other Liquor that could be employed, until for want of Remedy, or Anger of fuch a Distraction, certain Peafants cast Stones afar off into it; then the Flame somewhat slackning, drawing near, they put it out with Blows of Clubs, and other like, as if it had been a wild Beaft : Last of all, they threw in Cloaths from their Backs, which the more worn and fouler they were, the better they guenched the Fire." I use Dr. Hakewill's Translation.





#### CHAP. VII.

The Third Question answered, Whether Shall this Dissolution be gradual and successive, or momentaneous and sudden?

3. The Third Question is, Whether Third Question is and Jucceptive, or momentaneous and Judden?

I ANSWER, The Scripture resolves for the latter, The Day of the Lord hall come as a Thief in the Night: A Similitude we have often repeated in Scripture, as in the tenth Verse of this Chapter, in 1 Thess. xv. 2. Rev. iii. 3. and xvi. 15. And the Resurrection and Change of Things, it is said, shall be in a Moment, in the Twinkling of an Eye, 1 Cor. xv. 52. Consonant whereto both the Epicureans and Stoicks held their Dissolutions of the World should be sudden and brief, as Lucretius and Seneca, in the Place forementioned, tell us. And it is suitable to the Nature of Fire to make a quick Dispatch of Things, suddenly to consume and destroy.

AND as it shall be sudden, so also shall it be unexpected, being compared to the Coming of the Flood in the Days of Noah, Mat. xxiv. 37,38,39. But as the Days of Noah were,

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fo shall also the Coming of the Son of Man be. For as in the Days that were before the Flood, they were eating and drinking, marrying and giving in Marriage, until the Day that Noah entred into the Ark; And knew not until the Flood came and took them all away; so shall also the Coming of the Son of Man be. And the raining of Fire and Brimstone upon Sodom. Luke xvii. Thessal. v. 3. For when they shall say Peace and Safety, then sudden Destruction cometh upon them as Travail upon a Woman with Child. Now, if it shall be thus sudden and unexpected, it is not likely there should be in Nature any manifest Tendency to it, or remarkable Signs and Fore-runners of it: For fuch must needs startle and awaken the World into an Expectation and Dread of it. That there is at present no such Tendency to Corruption, but that the World continues still in as good State and Condition as it was two thousand Years ago, without the least Impairment or Decay, hath been, as we before noted, without any Possibility of Contradiction, clearly made out and demonstrated, by Dr. Hakewill in his Apology: And therefore, arguing from the past to the future, it will in all Likelihood so continue two thousand Years more, if it be so long to the Day of Doom; and consequently that Day (as the Scripture predicts) will suddenly and unexpectedly come upon the World. But if all these Prophecies (as Dr. Hammond affirms)

affirms) be to be restrained only to the Destruction of Jerusalem, and the Jewish Polity, without any farther Respect to the End of the World, then indeed from thence we can make no Inferences or Deductions in reserence to that final Period.

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## CHAP. VIII.

The Fourth Question Resolved, Whether shall there be any Signs or Fore-runners of the Dissolution of the World?

HE Fourth Question is, When ther shall there be any Signs or Fore-runners of the Disso-lution of the World?

In order to the Answering of this Question, we shall distinguish Signs into Natural

and Arbitrarious.

I. NATURAL Signs, so the Aurora, or Dawning of the Day, is a Sign of the Sun-Rising. Now, if the Dissolution be effected in the Course of Nature, and by Natural Means, there will be some previous natural Signs of it. An old House will threaten Ruin before it falls. The natural Death of Men, and all Animals, hath its Harbingers, and old Men before their Dissolution feel the Impres-

Impressions of Age; and proclaim to the World their approaching Fate, by Wrinkles, Gray Hairs, and Dimness of Sight. But we have formerly shewn, That there is no Confenescency or Declension in Nature; but that the World continues still as firm and staunch as it was three thousand Years ago; and why hereafter it should founder and decay more than it hath done for so many Ages heretofore, what Reason can be given? It is not therefore likely there should be any natural Signs of the Dissolution of the World, and consequently that it shall be effected by natural Means.

2. There are Arbitrary Signs, as a Garland hung out is a Sign of Wine to be fold. Now, if the Diffolution of the World be effected by Supernatural and Extraordinary Means, (as is most likely) the Signs of it must be arbitrarious. For though they may be natural Effects and Productions, yet would they not fignify the Destruction of the World, if they were not ordered by Providence to happen at that time, and predicted as Forerunners of it; with which otherwise they have no natural Connexion. Such Signs are Matth. xxiv. the Sun being darken'd, and the Moon not giving her Light, and the Stars falling from Heaven, and the Shaking of the Powers of Heaven. These, and many other Signs of His Coming, we find mentioned in Scripture; but what the Meaning of these Ex-

Expressions may be, is not so clear. For though some of them may be taken in a literal Sense, yet it is manifest that others cannot. The Sun may indeed be so covered with a Macula, as to be quite obscured; and thereupon the Moon necessarily lose her Light, which she borrows only from the Sun-Beams: But how the Stars should in a literal Sense fall down from Heaven, is inconceivable; it being almost demonstratively certain, that most of them are bigger than the whole Earth. We may therefore, keeping as near as we can to the Letter, thus interpret them. There shall be great Signs in Heaven, difmal Eclipses and Obscurations of the Sun and Moon; new Stars and Comets shall appear, and others disappear, and many fiery Meteors be suspended in the Air. The very Foundations of the Earth shall be shaken, and the Sea shall roar and make a Noise. But I must not here dissemble a great Difficulty: How can fuch illustrious Signs and Fore-runners be reconciled to the Suddenness and Unexpectedness of Christ's Coming, and the End of the World? Luke xxi. 25. After the Evangelist had told us, That there shall be Signs in the Sun, and in the Moon, and in the Stars, ---- the Sea and the Waves roaring; he adds, as a Confequent thereof, Ver. 26. Mens Hearts failing them for Fear, and for looking after those Things that are coming on the Earth. And, indeed. indeed, how could any Man possibly be buried in so profound a Lethargy of Senslessness and Security, as by such stupendous Prodigies not to be rowzed and awakened to an Expectation of some dismal and tremendous Event? How could he sing a Requiem to his Soul, and fay Peace and Safety, when the World so manifestly threatens Ruin about his Ears? For the reconciling of these Expressions to this sudden Coming of our Saviour to Judgment, it were most convenient to accept them in the Figurative and Metaphorical Sense. For if we understand them of the Ruin and Devastations of Cities and Countries, and Changes of Governments, the Subversions of Kingdoms and Commonwealths, the Falls and Deposings of Princes, Nobles, and great Men; these happening more or less in every Age, tho' the serious and inquisitive Christian, who searches and understands the Scriptures, may discern them to be the Signs of the World's Catastrophe; yet the careless and inconsiderate, the vicious and voluptuous are not like to be avall startled or moved at them, but may notwithstanding, looking upon them as ordinary and infignificant Accidents, dormire in utranque aurem, sleep securely till the last Trump awaken them. Or it may be answered, That these Prophecies do belong to the Destruction of Ferusalem only, and

fo we are not concerned to answer that Objection.

### Снар. IX.

The Fifth Question answered; At what Period of Time Shall the World be dissolved?

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H E Fifth Question is, At what Period of Time shall the World be dissolved? I answer, This is absolutely uncertain and undetermina-

ble. For, since this Dissolution shall be effected by the extraordinary Interposition of Providence, it cannot be to any Man known, unless extraordinarily revealed. And our Saviour tells us, That of that Day and Hour knoweth no Man, no not the Angels of Heaven, &c. Matth. xxiv. 36. And again, Acts i. 17. It is not for us to know the Times and the Seasons, which the Father hath placed in his own Power. And this Dr. Hakewill brings as an Argument, that the World decays nor, neither tends to Corruption; because, if it did, the Time of its actual Dissolution might be collected and foretold; which, saith he, the Scripture denies. We may invert this

Argumentation, and inferr, Because the World doth not decay, therefore the Time of its Dissolution cannot be known.

But yet, notwithstanding this, many have ventured to foretell the Time of the End of the World, of whom some are already confuted, the Term prefixt being past, and the World still standing. Lastantius, in his Time, said, Instit. lib. 7. cap. 25. Omnis expectatio non amplius quam ducentorum videtur annorum; The longest Expectation extends not farther than Two hundred Years. The Continuance of the World more than a Thoufand Years fince, convinces him of a gross Mistake. Paulus Grebnerus, a high Pretender to a Spirit of Prophecy, fets it in the Year 1613, induced thereto by a fond Conceit of the Numeral Letters in the Latin Word Judicium. Other Enthusiastical Persons of our own Country have placed it in the Years 1646, and 1656. The Event shews how ungroundedly and erroneously. Others there are, whose Term is not yet expired, and so they remain still to be confuted. As those who conceit, that the End of the World shall be when the Pole-Star shall come to touch the Pole of the Equator, which (say they) ever since the Time of Hipparchus, hath approached nearer and nearer to it. That it doth so, I am not satisfied; but if it doth, it is meerly Accidental, and hath no Connexion with the End of the World.

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the most famous Opinion, and which hath found most Patrons and Followers, even amongst the Learned and Pious, is that of the World's Duration for Six thousand Years. For the strengthening of which Conceit, they tell us. That as the World was created in fix Days, and then followed the Sabbath, fo shall it remain Six thousand Years, and then shall succeed the Eternal Sabbath. Heb. iv. 9. "Αρα απολείπεται Σαββατισμός, &c. There remains, therefore, a Rest or Sabbath to the People of Go D. Here we see, that the Apostle institutes a Comparison between the heavenly Rest and the Sabbath. Therefore, as God rested upon the Seventh Day, so shall all the World of the Godly rest after the Six Thoufandth Year. For he that hath entred into his Rest, ceaseth from all his Works, as God did from His. Of this Opinion were many of the Ancient Fathers, as I shewed before, grounding themselves upon this Analogy between the Six Days of the Creation and the Sabbath; and the Six Thousand Years of the World's Duration, and the Eternal Rest: For, faith Irenaus in the Place before quoted, Hoc autem, (that is, the History of the Six Days Creation, and succeeding Sabbath) est & præteritorum narratio, & futurorum prophetia. Dies enim unus mille annos significat. sicut Scriptura testatur: 2 Pet. iii. 8. Psal. xc. 4. The Scriptures reckoning Days of One thousand Years long, as in Verse 8. of this Chapter, and in Psal. xc. 4. This is likewise a received Tradition of the Jewish Rabbins, registred in the Talmud, in the Treatise Sanhedrim, delivered (as they pretend) by the Prophet Elias the Tishbite to the Son of the Woman of Sarepta, whom he raised from the Dead, and by him handed down to Posterity. I rather think with Reuterus, that the Author of it was some Rabbi of that Name. The Tradition is, Sex millia annorum erit mundus: & uno millenario vastatio, i. e. Sabbathum Dei : Duo millia inane : Duo millia Lex: Duo millia dies Messia. Two thousand Years Vacuity: Two thousand Years of the Law: Two thousand Years the Days of the Messiah. But they shoot far wide: For, according to the least Account, there passed a far greater Number of Years before the Law was given, 2513, saith Reuterus; and, on the contrary, less Time from the Law to the Exhibition of the Messiah. All these Proofs laid together, do scarce suffice to make up a Probability. Neither do those Rabbinical Collections from the fix Letters in בראשית the first Word of Genesis, or from the six Alephs in the first Verse of that Book, each fignifying a Thousand Years; or from the Six first Patriarchs in the Order of the Genealogy to Enoch, who was caught up to Heaven, and found no more, add much Weight to this Opinion. S. Austin very modestly concludes, after a Discussion of this Point Point concerning the World's Duration; Ego tempora dinumerare non audeo: Nec aliquem Prophetam de hac re numerum annorum existimo præsinivisse. Nos ergo, quod scire nos Dominus noluit, libenter nesciamus. I dare not calculate and determine Times: Neither do I think, that concerning this Matter, any Prophet hath predicted and defined the Number of Years. What therefore the Lord would not have us to know, let us willingly be ignorant

of.

But though none but presumptuous Per-fons have undertaken peremptorily to determine that Time, yet was it the common and received Opinion and Persuasion of the Ancient Christians, that that Day was not far off: And had they been to limit it, they would hardly have been induced to fet the Term so forward and remote from their own Age, as by Experience we find it proves to be, but in their own Times, or shortly after: And many Places of Scripture feem to favour that Opinion; so that some have pre-fumed to say, That the Apostles themselves were at first mistaken in this Particular, till after farther Illumination they were better informed. But though this be too bold a Conceit, yet that the Churches, at least some of them, did at first mistake the Apostles Meaning, in their Sermons and Epiftles concerning this Point, and so understand them, as to think that the End of the World and Dd Final

Final Judgment was at hand, appears from 2 Theff. ii. 2. I beseech you, Brethren, that ye be not soon shaken in Mind, or be troubled, neither by Spirit, nor by Word, nor by Letter, as from us, as that the Day of CHRIST is at hand. We see the Apostle labours to rectify, and for the future to prevent this Mistake: So, likewise, the Apostle Peter, in the 8th and 9th Verses of this Chapter. And yet this Opinion had taken such deep Root in them, that it was not easy to be extirpated; but continued for some Ages in the Church. Indeed, there are so many Places in the New Testament which speak of the Coming of CHRIST as very near, that if we should have lived in their Time, and understood them all as they did, of His Coming to judge the World, we could hardly have avoided being of the same Opinion. But if we apply them (as Dr. Hammond doth) to His Coming to take Vengeance on His Énemies, then they do not hinder, but that the Day of Judgment, I mean the General Judgment, may be far enough off. So I leave this Question unresolved, concluding, that when that Day will come God only knows.





#### CHAP. X.

## How far this Conflagration Shall extend.

SIXTH Question is, How far A shall this Constagration extend? Whether to the Ethereal Heavens, and all the Host of them, Sun, Moon, and Stars, or to the Aereal

only?

I ANSWER, If we follow ancient Tradition; not only the Earth, but also the Heaven's and heavenly Bodies will be involved in one common Fate, as appears by those Verses quoted out of Lucretius, Ovid, Lucan, &c.

OF Christians some exempt the Ethereal Region from this Destruction; for the two following Reasons, which I shall set down in Reuterus's Words: 1. Because in this Chapter ter the Conflagration is compared to the Deluge in the Time of Noah. But the Deluge extended not to the upper Regions of the Air, much less to the Heavens, the Waters arising only sisteen Cubits above the Tops of the Mountains, if so much. Therefore neither shall the Conflagration transfernd that Term." So Beza, upon 2 Pet. iii. 6. Tantum ascendet ille ignis quantum aqua altior supra omnes montes. That Fire shall ascend as high as the Waters stood above the Mountains.

Mountains. This Passage I do not find in the last Edition of his Notes. The ordinary Gloss also upon these Words, 2 Thess. i. 2. In flaming Fire rendring Vengeance, faith, Christum venturum præcedet ignis in mundo, qui tantum ascendet quantum aqua in diluvio. There shall a Fire go before CHRIST when He comes, which shall reach as high as did the Water in the Deluge. And S. Augustin De Civit. Dei lib. 20. cap. 18. Petrus etiam commemorans factum ante diluvium, videtur admonuisse quodammodo, quatenus in fine bujus seculi istum mundum periturum esse credamus. Peter also mentioning the ancient Deluge, seems in a manner to have advised us how far, at the Consummation of Time, we are to believe this World shall perish.

But this Argument is of no Force, because it is not the Apostle's Design in that Place to describe the Limits of the Conflagration, but only against Scoffers, to shew, that the World should one Day perish by Fire, as it had of old been destroyed by Water.

2. THE second Reason is, Because the heavenly Bodies are not subject to Passion, Alteration, or Corruption. They can contract no Filth, and so need no Expurgation

by Fire.

To this we answer, not in the Words of Reuter, but our own; That it is an idle and ill-grounded Conceit of the Peripateticks, That the Heavenly Bodies are of their own

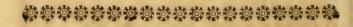
Nature

Nature incorruptible and unalterable: For on the contrary it is demonstrable, that many of them are of the same Nature with the Earth we live upon, and the most pure, as the Sun, and probably too the fix'd Stars, suffer Alterations; macula, or opaque Concretions being commonly generated and diffolved in them. And Comets frequently, and sometimes New Stars, appear in the Ethereal Regions. So that these Arguments are insufficient to exempt the Heavens from Dissolution; and on the other side, many Places there are in Scripture which feem to fubject them thereto: As Psal. cii. 25, 26. recited Hebr. i. 10. which hath already often been quoted, The Heavens are the Works of Thy Hands; They shall perish. Matth. xxiv. 35. Heaven and Earth shall pass away. Isa. lxv. 17. and li. 6. The Heavens shall vanish away like Smoke. Yet am I not of Opinion that the last Single shall was here the last Single shall was here the last Single shall was here. nion, that the last Fire shall reach the Heavens; they are too far distant from us to fuffer by it: Nor indeed doth the Scripture affirm it; but where it mentions the Dissolution of the Heavens, it expresseth it by such Phrases as seem rather to intimate, that it shall come to pass by a Consenescency and Decay, than be effected by any sudden and violent Means. Psal. cii. 25, 26. They all shall wax old as doth a Garment, &c. Though I confess nothing of Certainty can be gathered from such Expressions: For we find the Dd3 fame

# Of the Dissolution

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fame used concerning the Earth, Isa. li. 6. The Heavens shall vanish away like Smoke, and the Earth shall wax old as doth a Garment. The Heavenly Bodies are none of them uncorruptible and eternal; but may in like manner as the Earth be consumed and destroyed, at what Times, and by what Means, whether Fire, or some other Element, the Almighty hath decreed and ordered.



### CHAP. XI.

Whether shall the whole World be confumed and annihilated, or only refined and purified?

Whether shall the World be wholly consumed, burnt up and defiroyed, or annihilated; or only refined, purified, or renewed? To this I answer, That the latter Part seems to me more probable, viz. That it shall not be destroyed and annihilated, but only refined and purified. I know what potent Adversaries I have in this Case. I need name no more than Gerard in his Common Places, and Dr. Hakewill in his Apology, and the Desence of it,

who contend earnestly for the Abolition or Annihilation. But yet upon the whole Matter, the Renovation or Restitution seems to me most probable, as being most consonant to Scripture, Reason, and Antiquity. The Scripture speaks of an amonaraçaois, or Restitution, Acts iii. 21. Whom the Heavens must contain until the Time of the Restitution of all Things; speaking of our Saviour: and  $\pi\alpha$ λιγγεννεσία, or Regeneration of the World, the very Word the Stoicks and Pythagoreans use in this Case, Matt. xix. 28, 29. Verily, I say unto you. That ye which have followed me. in the Regeneration, when the Son of Man shall sit on the Throne of His Glory, ye also shall sit upon twelve Thrones, &c. Psal. cii. 26. As a Vesture shalt thou change them, and they shall be changed. Which Words are again taken up and repeated, Heb. i. 12. Now it is one thing to be changed, another to be annihilated and destroyed. 1 Cor. vii. 31. παράγει τὸ σχημα τε νόσμε τέτε, The Fashion of this World passeth away. As if he had faid, It shall be transfigured, or its outward Form changed, not its Matter or Substance destroyed. Isa. lxv. 17. Behold I create new Heavens and a new Earth, and the former shall not be remembred, nor come into Mind. Isa. lxvi. 22. As the new Heavens and new Earth, which I shall make, shall remain before me. To which Places the Apostle Peter seems to referr in those Words, 2. Pet. iii. 13. Dd4

Nevertheless we, according to His Promise, look for new Heavens, and a new Earth, wherein dwelleth Righteousness. This new Heaven and new Earth we have also mentioned, Rev. xii. 1. And I saw a new Heaven and a new Earth; for the first Heaven and the first Earth were passed away, and there was no more Sea. These Places, I confess, may admit of an Answer or Solution by those who are of a contrary Opinion, and are answered by Doctor Hakewill: yet all together, especially being back'd by ancient Tradition, amount to a high Degree of Probability. I omit that Place, Rom. viii. 21, 22. The Creature itself also shall be delivered from the Bondage of Corruption, into the glorious Liberty of the Sons of God: Tho' it be accounted the strongest Proof of our Opinion, because of the Obscurity and Ambiguity thereof.

2. For Antiquity, I have already given many Testimonies of the ancient Fathers and Doctors of the Church, and could, if Need were, produce many more, the whole Stream of them running this way. And tho' Dr. Hakewill saith, That if we look back to higher Times before S. Hierom, we shall not easily find any one who maintained the World's Renovation; yet he hath but two Testimonies to alledge for its Abolition; the one out of Hilary upon the Psalms, and the other out of Clemens his Recognitions. To this Restitution of the World, after the Conflagration,

flagration, many also of the Heathen Philosophers bear Witness, whose Testimonies Mr. Burnet hath exhibited in his Theory of the Earth, lib. 4. cap. 5. Of the Stoicks, Chrysippus de Providentia, speaking of the Renovation of the World, saith, Ημας, μετα Αρμα Τὸ τελευτῆσαι, πάλιν περιόδων τινῶν είλημμένων 1.7. c. 23. χεένε, είς δ νῦν ἐσμεν ἀποκαταςήσεσθαι σχήμα. We, after Death, certain Periods of Time being come about, shall be restored to the Form we now have. To Chrysppus Stobaus adds Zeno and Cleanthes, and comprehends together with Men all natural Things, Zhuwu, nai Κλεάνθει, καὶ Χρυσίππω άρέσκει την εσίαν μεταβάλλειν, οίον είς σπέρμα, τὸ πῦρ καὶ πάλιν ἐκ τέτε τοιαύτην αποτελείσθαι την διαμόσμησιν οία πεότερον ην. Zeno, and Cleanthes, and Chrysippus, were of Opinion, That the Nature or Substance of Things changes into Fire, as it were into a Seed; and out of this again, such a World or Frame of Things is effected as was before. This Revolution of Nature, Antoninus, in his Meditations, often calls την περιοδικήν παλιγγευνεσίαν των όλων, The Periodical Regeneration of all Things. And \* Origen, \* Lib, ,. against Celsus, saith of the Stoicks in general, Φασί ή οἱ ἀπὸ τῆς Στοᾶς κατὰ περίοδον ἐκπύρωσιν τε παντός γίνεσθαι, και έξης αυτή διακόσμησιν πάντ' ἀπαράλλαμτα έχεσαν ώς πεός την έτέραν Sianoounow. The Stoicks say, That at certain Periods of Time there is a Conflagration of the Universe; and after that a Restitution thereof baving

\* Prap. Evang. having exactly the same Disposition and Furniture the former World had. More to the like Purpose concerning the Stoicks, we have in \* Eusebius out of Numenius. Nature, saith he returns els the avacagie eneiver the moisσαν ένιαυτον τον μέγιζον, καθ' ον άπ' άυτης μόνης είς αυτήν πάλιν γίνεται ή αποματάζασις επανελθεσα ή κατά τάξιν άΦ' οίας διακοσμεῖν ώσαύτως ήρξατο, κατά λόγον πάλιν την αυτήν διεξαγωγήν ποιείται, των τοιέτων περιόδων έξ αίδίε γενομένων αναταπαύςως, to the Resurrection which makes the great Year, wherein there is again a Restitution made from itself alone to itself. For returning according to the Order wherein it began first to frame and dispose Things, (as Reason would) it again observes the same OEconomy or Administration; the like Periods returning eternally without ceasing. He that desires more Authorities of the Heathen Philosophers and Poets, in Confirmation of the World's Restitution after the Conflagration, may confult the same Mr. Burnet in the Place forequoted; where he also shews, that this Doctrine of the Mundane Periods was received by the Grecians from the Nations they call Barbarous. Pythagoras, saith Porphyry, brought it first into Greece: And Origen witnesseth of the Egyptian Wise Men, that it was delivered by them. Laertius out of Theopompus relates, That the Persian Magi had the same Tradition; and Berosus saith, that the Chaldeans also. In fine, among all the barbarous NaNations, who had among them any Person or Sect, and Order of Men, noted for Wisdom or Philosophy, this Tradition was current. The Reader may consult the Book we referr to, where is a notable Passage taken out of Plutarch's Tractate, De Iside & Osiride, concerning a War between Oromazes and Arimanius, somewhat parallel to that mentioned in the Revelation between Michael

and the Dragon.

more consonant to Reason than its Abolition. For if the World were to be annihilated, what needed a Consagration? Fire doth not destroy or bring things to nothing, but only separate their Parts. The World cannot be abolished by it, and therefore had better been annihilated without it. Wherefore the Scripture mentioning no other Dissolution than is to be effected by the Instrumentality of Fire, it's clear, we are not to understand any utter Abolition or Annihilation of the World, but only a Mutation and Renovation, by those Phrases of perishing, passing away, dissolving, being no more, &c. They are to be no more in that State and Condition they are now in.

2. There must be a material Heaven, and a material Hell left. A Place for the glorified Bodies of the Blessed to inhabit and converse in; and a Place for the Bodies of the Damned, a Κολαςήριου, or Prison for them to be shut up in. Now, if the Place of the Blessed

Blessed be an Empyreal Heaven far above these visible Heavens, as Divines generally hold; and the Place of the Damned be beneath, about the Middle of the Earth; as is the Opinion of the School-Men, and the Church of Rome, and as the Name Insert imports, and as the ancient Heathen described their Tartarus,

Hom. II.

------ εἰς τάρταραν ἠεεξεντα Τῆλε μάλ' ἦχι βάθιςον ὑπὸ χθονός ἐςι βέρεθεθν, Τόσσον ἔνερθ' ᾿Αίδεω ὅσον ἕρανος ἐς' ἀπὸ γαίης.

Then when all the intermediate Bodies shall be annihilated, what a strange Universe shall we have? consisting of an immense Ring of Matter, having in the Middle a vast Vacuity, or Space void of all Body, fave only one small Point for an infernal Dungeon. Those that are of this Opinion have too narrow and mean Thoughts of the Greatness, I had almost said Immensity of the Universe, the glorious and magnifick Products of the Creator's Almighty Power; and are too partial to themselves, to think the whole World was created for no other End but to be serviceable to Mankind: But of this I have faid somewhat in a former Discourse, and therefore shall not at present enlarge upon it.

But let us hear what they have to fay for

the Abolition.

Hakewill's Their first and most weighty Argument is Apol. 1.4. taken from the End of the World's Creation, which

which was partly and chiefly the Glory of the Creator, and partly the Use of Man, the Lord Deputy, as it were, or Viceroy thereof. Now for the Glory of the Creator, it being by the admirable Frame of the World manifested unto Man, Man being removed out of the World, and no Creature being capable of fuch a Manifestation besides him, we cannot imagine to what Purpose the Frame itself should be left, and restored to a more perfect Estate. The other End, being for Man's Use, either to supply his Necessity in Matter of Diet, of Physick, of Building, of Apparel; or for his Instruction, Direction, Recreation, Comfort and Delight; or lastly, that therein, as in a Looking-glass, he might contemplate the Wisdom, the Goodness and Power of God; when he shall attain that blessed Estate, as he shall have no farther Use of any of these, enjoying perfect Happiness, and seeing God as He is, Face to Face, the second or subordinate End of the World's Being must needs be likewise frustrate. And what other End can be given or conceived for the remaining or restoring thereof? &c.

To this I answer, there may be an End of the restoring of the World, tho' we are not able to find out or determine what. We are too short-sighted to penetrate the Ends of God. There may be a new Race of rational Animals brought forth to act their Parts upon this Stage, which may give the Crea-

tor as much Glory as Man ever did or coulds And yet if there should be no material and visible rational Creature made to inhabit the Earth, there are spiritual and intellectual Beings, which may be as bufy, and as much delighted in fearching out, and contemplating the Works of God in this new Earth, and rendring Him the Praise of His Wisdom and Power as Man could be. These Things we may conjecture; but we must leave it to the only wife God to determine what Use shall be made of it. It seems to me to be too great Presumption, and over-valuing our-Telves, to think that all this World was fo made for us, as to have no other End of its Creation, or that Go D could not be glorified but by us.

This first and principal Argument being answered, the second admits of an easy Solution. They enquire whether the Vegetables, and Creatures endued with Sense, shall all be restored, or some only? namely such as shall be found in Being at the Day of Judgment. If all, where shall we find Stowage for them? Surely we may in this case properly apply that which the Evangelist in another useth figuratively, if they should all be restored, even the World itself could not contain the Things which should be restored. If some only, then would I gladly know, why those some should be vouchsafed this great Honour, and not all, or how those

Creatures

Creatures without a Miracle shall be restrain'd from propagating and multiplying, and that infinitely in their Kinds by a perpetual Generation. Or lassly, How the several Individuals of these Kinds, shall, contrary to their Primitive Natures, live and dure

immortally?

To all this I answer, That not only all Animals, but all Vegetables too, yea, and their Seeds also, will doubtless be mortified and destroyed by the Violence of the Conflagration; but that the same should be restored, and endued with eternal Life, I know no Reason we have to believe; but rather that there should be new ones produced, either of the same with the former, or of different Kinds, at the Will, and by the Power of the Almighty Creator, and for those Ends and Uses for which He shall design them. This Question being answered in this Manner, all that follows concerning the Earth remaining without any Furniture or Inhabitants, &c. falls to the Ground. So I have dispatch'd these Seven Questions concerning the Dissolution of the World, there remains now only the Inference or Use of the precedent Doctrine.





#### CHAP. XII.

The Apostle's Inference from the precedent Doctrine.

Apostle makes from the precedent Doctrine, What manner of Persons ought we to be in all holy Conversation and Godliness? One Word here needs a little Explication and

Word here needs a little Explication, and that is Holy. What is meant by a holy Con-

versation?

HOLINESS is an Equivocal Term. It is attributed either to God, or to the Creature. When it is attributed to God, it sig-

nifies either,

1. The unspotted Purity of His Nature, and the constant and immutable Rectitude of His Will. So it is taken, I John iii. 3. And every Man that hath this Hope in him, purisheth himself as He is pure: And, I Pet. i. 15. As He, which called you, is Holy, so be ye Holy in all manner of Conversation; because it is written, Be ye Holy, for I am Holy. Psal. cxlv. 17. The Lord is Righteous in all His Ways, and Holy in all His Works.

2. His Sovereign Majesty and Greatness appearing in His transcendent Wisdom and Power, in His Supreme and Absolute Domi-

nion over all things: In respect whereof, He is called the Holy One of Israel, and His Name is faid to be Holy: That is, to be invoked with the greatest Reverence. Holy and Reverend is His Name. Because of this His Greatness and Excellency, He is to be worshipped, and adored with the most submissive Humility and Veneration, with a transcendent and incommunicable Worship and Devotion.

WHEN Holiness is attributed to Creatures, it fignifies either an Inherent and Inward, or a Relative or Outward, Holiness.

1. INHERENT OF Inward Holiness is a Conformity of Heart and Life to the Will of God: Or, as \* others define it, An habitual \* Bishop Frame of Mind: Whereby we are fitted for Wilkins's Vertuous Actions, but more especially for Character. the Duties of Religion. Indeed, Holiness doth always include a Reference to GoD.

2. RELATIVE or Outward Holiness results from a Separation and Setting apart any thing from a prophane and common, and applying it to a facred or religious Ufe. For, the Majesty of God, who at first created, and continually sustains and governs all things, being so great and inviolable, all Persons, Things, and Times, and Places, and Ceremonies, separated and appropriated to His Service and Worship, are by all Nations esteemed Sacred, and to have a Character of Holiness imprinted on them:

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By Holiness, in this Place, is to be understood an inherent Holiness, which is well defined by Dr. Outram, A Conformity of Heart. and Life to the Will of God. I shall not crif. 1. 5. discourse at large concerning a holy Converfation, nor instance Particulars wherein it consists. That would be to write a Body of Practical Divinity. I shall, therefore, at prefent, suppose the Reader sufficiently instru-Eted in that. My Business shall be to shew the Strength of the Apostle's Inference.

IT may be faid, How doth this Dissolution. concern us, who may, perchance, be dead and rotten a Thousand Years before it comes?

What have we to do with it?

I ANSWER, It concerns us, 1. Because, it's possible, it may happen in our Times; it may furprize us before we are aware. The precise Time thereof is uncertain. And it shall be fudden and unexpected, coming as a Thief in the Night, as we have before shewn: Therefore, we ought always to be upon our Guard, to have our Loins girt about, and our Lights burning. This Use the Scripture, in many Places, makes of the Uncertainty of the Time of Christ's Coming, Luke xii. 40. Be ye therefore ready: For the Son of Man cometh at an Hour when ye think not. Luke xxi. 34, 35. And take heed to yourselves, lest at any time your Hearts be overcharged with Surfeiting and Drunkenness, and Cares of this Life, and so that Day come upon

you unawares. For as a Snare shall it come on all them that dwell on the whole Earth. Parallel whereto are Matth. xxiv. 42. and Mark xiii. 33,35. That it shall come is certain, when it shall come is uncertain, and it every day draws nearer and nearer; therefore, it is not Wisdom to remove the Evil Day far from us: And as in reference to the Day of Death, it is an usual and prudent Advice, so to live every Day, as if it were our last Day; or at least, as we would not be afraid to do should it be so: Because, we are sure, that one Day will be our last, and, for ought we know, the present may be it. So, likewise, it is rational Counsel, in respect of the End of the World, so to prepare ourselves for it by a holy Conversation, that we may get above the Terror and Dread, which will otherwise attend the Apprehension of the Approach of it; and that we may be provided against the worst that may follow, and be secure come what can come.

Secondly, It concerns us, should it be a Thousand Years to come. Because then is the general Resurrection both of the Just and Unjust, Acts xxiv. 15. and the general Judgment, When we must all appear before the dreadful Tribunal of Christ, that every one may receive the Things done in his Body, according to that he hath done, whether it be good or bad, 2 Cor. v. 10. which, Rom. ii. 5. is called the Revelation of the righteous Judgment

ment of God. Who will render to every Man according to his Deeds, &c. Upon this Account, I say, it concerns us much how we have our Conversation here.

First. As we hope to be acquitted at that T. Day, and to enter into those new Heavens, in which dwells Righteousness. Holiness is a necessary Condition, and antecedent to Happiness. Necessary, I say,

1. By God's Appointment, Heb. xii. 14. Follow Peace with all Men, and Holines, without which no Man shall see the LORD. .Rom. vi. 22. Have your Fruit unto Holiness, and the End Eternal Life. Psal. 50. ult. To him that ordereth his Conversation aright, will I shew the Salvation of God. Eternal Life is the Gift of God. He is not obliged to bestow it upon any Man. He may make what Condition he pleases for the obtaining of it. No Man hath any Right to it: No Man can lay any Claim to it, but from this Donation, and from the Performance of these Conditions. Rev. xxii. 14. Blessed are they that do His Commandments, that they may have Right to the Tree of Life, and may enter in through the Gates into the City. For without are Dogs, and Whoremongers, and Sorcerers, &c. All the Right they have depends upon God's Promise, which is Conditionate, and accrues to them by the Performance of the Condition, which is the Doing of His Commandments.

2. NECESSARY, not only by God's Appointment, but in the very Nature of the Thing. Holiness is the very Quality and Complexion of Heaven. No Man without it is qualified to be a Subject of that Kingdom: For, thereinto nothing that is impure or unclean can enter. Rev. xxi. 27. And there shall in no wise enter into it sthe New Ferusalem any thing that defileth, neither what soever worketh Abomination. In this new Heaven dwelleth Righteousness, 2 Pet. iii. 15. Therefore, 1 John iii. 3. Every Man that hath this Hope in Him, purifieth himself as He is pure. Heaven would naturally spue out and eject a wicked Person, as one heterogeneous to it. Heaven and Hell are not more distant in Place, than they are in Nature. There is not more Antipathy between Fire and Water, between Light and Darkness, between Streight and Crooked, neither are they more incompatible, or do more naturally refift and expell one another, than Holinels, which is the Quality of Heaven, or Wickedness, which is the Dispofition and Temper of Hell. Some do think Heaven to be rather a State than a Place; and that he that is Partaker of the Divine Nature hath Heaven within him. This is true, but this is not all. The whole Notion of Heaven comprehends both a State and a Ee 3

Place. A Man must be in a heavenly State, before the local Heaven can receive him, or he brook it. Heaven without him would be no Heaven, to the Man who hath not Heaven within him. A wicked Person could find no Bufiness or Employment in Heaven; nothing to fatisfy his corrupt and depraved. Affections, Inclinations, and Appetites. He would there meet with no fuitable Company; no Persons, whose Conversation he could take any Delight and Complacency in, but rather hate and abhor. For, what Fellowship hath Righteousness with Unrighteousness? Or, what Communion bath Light with Darkness? 2 Cor. vi. 14. Like naturally loves Like, and unites with it, and doth refuse, resist, and hate that which is Unlike it. For every thing is made to love itself, and, consequently, whatsoever resembles and comes near it, and is as it were a Replication of it; and to hate the contrary. As, therefore, we would be glad to be Partakers of the Blessedness of the local Heaven, so let us endeavour to get into our Minds and Spirits the Qualities and Conditions of Heaven; that so we may be fit Subjects for that Kingdom, fit Companions for that Society. This is the Time allotted us to purify ourselves from all Filthiness both of Flesh and Spirit, and to perfect Holiness in the Fear of God. There is no Invention in the Grave, whither we are going, Eccl. ix. 10. Upon this Moment depends Eternity. As the Tree

Tree falls, so it lies, Eccles. And as Death leaves, so will Judgment find us. Quando isthine excessum fuerit, nullus jam locus panitentiæ est. Hic vita aut amittitur, aut tenetur: Hic saluti aterna cultu Dei & fructu fidei providetur. Cyprian. Serm. de Immortal. After we shall depart hence, there remains no more Place for Repentance. Eternal Life is here either lost or won. Here Provision is made for everlasting Salvation, by the Worship of God, and Fruit of Faith. We must work while it is Day, the Night [of Death] cometh wherein no Man can work, John ix. 4. And, therefore, the Time our Bodies shall rest in the Grave, should it be a Thousand Years, will little avail us: For, if the Soul be mean while awake, the certain and dreadful Expe-Etation of the Sentence of Condemnation to an eternal Hell at the Day of Judgment, will be little less afflictive than the Torments thereof themselves. I might add, by way of Digressions that Sin and Wickedness is naturally productive of Hell in the Soul. A wicked Man carries Hell in his Breaft. Sin necessarily inferrs Misery; It is contrary to the Nature of the Soul; and whatsoever is so, must needs be grievous. Diversion and Non-Attention to his Condition, is the wicked Man's only Security: I have heard it often from a \* great Divine in his Sermons, \* Dollor. That there is but a Thought's Distance between Witchcos. a wicked Man and Hell. For, do but fix and Ee 4

bind his Thoughts to the Consideration of his Life and Actions, and he will anticipate Hell himself, he shall need no infernal Furies to lash him, he will be his own Tormentor: Such a Man's Pressures will be heavy enough, should the Divine Nemesis superadd no more. The Reason of this I have given in a former Discourse, and therefore shall now omit what else might have been added on this Particular.

II. Secondly, It much concerns us, upon account of the future Judgment which shall be at the Dissolution of the World, to have our Conversation in all Holiness, as we desire to avoid that Shame and Misery which will then

otherwise certainly befall us.

1. As we defire to avoid that Shame which will cover our Faces at that Day. If here Shame and Disgrace be more grievous and insupportable than Death itself, what will it be then, when the Soul shall be rendred more quick, and apprehensive, and senfible of fuch Impressions? There is nothing shameful but Sin, nothing else hath any natural Turpitude in it. Shame follows Sin as the Shadow doth the Body. He that will commit the one, cannot avoid the other. Therefore, such wicked Persons as have not quite renounced Modesty, and lost all Sense of Shame, especially, if guilty of secret Crimes, the Consideration of a future Judgment would be a powerful Curb to restrain them

them from Sin for the future: Because then God will produce and bring to light the hidden Things of Darkness, and disclose and make manifest the Counsels of all Hearts, 1 Cor. iv. 5. Then He will judge the Secrets of Men by Je. sus Christ, Rom. ii. 16. Then will He bring every Work into Judgment, with e-very secret thing, Eccles. xii. 14. For, would they but consider and ponder, what Confusion will overwhelm them when this shall be done in the Face of the whole World, and before all that knew them, and they not able to make any Denial, or Excuse: This, I fay, if any thing, would be a powerful Curb to withhold them from those Enormities to which this Shame is appendent. It may be thou madest a great Figure in the World for Piety and Religion, wouldst seem to be Some-body in the Eyes of Men, when thou wert false and unsound, didst harbour and nourish some Viper in thy Bosom;

### Introrsum turpis, speciosa pelle decorus:

When thy secret Faults shall be exposed before thy Neighbours, and Friends, and Children; And the Shame of thy Nakedness shall be made appear, Rev. iii. 18. How wilt thou then be confounded and astonished, and unable to lift up thy Head? What Horror will then seize thee, when thy Confusion shall be continually before thee, and the Shame of thy Face shall cover thee? Psal. xliv. 15. It concerns

cerns thee, therefore, to look about thee in time, and fearch thy Conscience to the Bottom, to remove whatever grates, to cast out whatever offends, though never so customary, never so pleasing to Flesh and Blood: To apply thyself to the Merits and Satisfaction of Christ Jesus, for the Expiation of what is past; and, for the suture, to resolve and endeavour the Amendment of whatfoever hath heretofore been amiss in thee; and to beg the Affistance of the Divine Grace to strengthen in thee every good Purpose and Resolution of Heart, and to enable thee to bring it to Issue and Effect. And for thy Security, I think it good Advice, to resolve so to behave thyself in thy Retirements, fo to live in the Secret of thy Chamber and Closet, as though the Doors were thrown open upon thee, and all the Eyes of the World beheld thee; as though thou were't in the Arena of a Publick Theatre, exposed to the View of Men and Angels. I remember the ingenious Writer of Politick Discourses, Boccalini, doth often divert himfelf and his Reader, with facetious Resections upon the Contrivance of a Window into the Breast; which, if I mistake not, he fathers upon Lipsius. However he may deride it, I think it would be prudent Counsel to give and take, for every Christian, so to live and carry it in the Secret of his Heart, as if there were a Window into his Breast, that

every

every one that passed by, might look in thereat, and see all the Thoughts and Imaginations that passed there, that found any Entertainment or Acceptance with him. For though, indeed, Go fearches the Hearts and Reins, and understandeth our Thoughts afar off, Pfal. cxxxix. 2. Yet fuch is the Hypocrify of Mankind, that they do, for the most part, more reverence the Eyes of Men than of God; and will venture to do that in His Prefence, which they would be ashamed the Eyes of Man should see them doing. You will fay, Is it not better to be modest, than to be impudent? Is it not better to conceal, than to publish one's Shame? Is it not better to reverence Man, than neither God nor Man? Doth not the Scripture condemn a Whore's Fore-head? Is it not a true Proverb, Past Shame, past Grace ?? Was it not good Advice of a Cardinal (as I remember) Si non castè, tamen cautè? He that hath devoured Shame, what Bridle is there left to restrain him from the worst of Evils? I answer, That it seems indeed to me, that publick Sins of the same Nature, are more heinous than secret; and that Impudence in finning, is an Aggravation of Sin. For open Sinsdare God, and bid Defiance to Heaven, and leave the Sinner unreclaimable, and are of more pernicious Influence. I do not now speak of the Hypocrify of feigning Holiness to serve our own Ends, which is rightly esteemed duplex iniquitas, but

but that of concealing and hiding vicious Actions, to avoid the Shame of Men. And yet, there is a great Obliquity in this too. Because, even this is a slighting and undervaluing of God, a preferring of Man before Him, fetting a greater Price and Esteem upon the Praise and Commendation of Men, than the Praise and Approbation of God, John xii. 43. God sees the secretest Actions, yea, the most retired Thoughts. They that believe this, and yet make bold to do in His Presence, what the Fear of Man's Eye would restrain them from, it is clear that they reverence Man more than God; a poor, frail, impotent Creature like themselves, more than the most Pure and ever Blessed Creator. Nay, let the Temptation to any Sin be never fo strong, and the natural Inclination never fo vehement, if the Knowledge and Conscience of Men be a Motive and Confideration powerful enough to enable us to refift and repell them, had we but as firm a Belief of the Presence and Inspection of God, and as great a Reverence and Dread of Him, why should not these have the same Influence and Effect upon us? Let us then avoid the Hypocrify of desiring to be thought better than we are, by endeavouring, to our utmost, to be as good as we would be thought to be, and, if possible, better. So shall we satisfy ourselves that we feek the Praise of God, more than the Praise of Men.

HERE, before I proceed, I cannot but admire the Wisdom and Goodness of Almighty God, in implanting fuch a Passion in the Nature of Man, as Shame, to no other Use or Purpose, that I can imagine, than to restrain him from vicious and shameful Actions. A Passion I call it, because the Body, as in other Passions, suffers from it, and that in a peculiar manner; it causing a sudden Motion of the Blood to the outward Parts, especially to the Face, which is called Blushing, and a Dejection of the Eyes. If you ask me what Shame is, I answer, It is an ungrateful and afflictive Sense of Soul, proceeding from Dishonour. Now Dishonour is nothing else but Mens ill Opinion of me, or Dislike and Condemnation of my Actions, some way declared and manifested to me; which, why I should have such an Abhorrence of, and why it should be so grievous and tormenting to me, there seems not to be a sufficient Ground and Foundation in the Nature of the Thing, supposing such as have this Opinion have neither Power nor Will to hurt my Body, but only in the Ordination of God, who hath fo made our Natures, to secure our Innocency, and withhold us from the Commission of what is difgraceful and ignominious, as all finful Actions, and none else, are.

And as for fecret Sins, I think Shame may take Place there too. It was a Precept of the Pythagoreans, Πάντων ζημάλις αίσχύνεο σαυτόν.

Of

Of all Men reverence yourfelf most: Be ashamed to do that before yourself, which before others you would abhorr or blush to do; otherwise you must suffer Dishonour from yourself, and condemn your own Actions, which will, in all reason, be more grievous and afflictive than the ill Opinion and Word of other Men. Hence, Conscience of Sin is esteemed a most painful and tormenting thing, by the generality of all Mankind, tho no other Man be privy to it.

Xii. 2.

But to return from whence we digressed. \* Daniel though \* Shame and everlafting Contempt shall, at the general Resurrection, be the Portion of them who persist and die in their Sins; yet a ferious and unfeigned Repentance, atteffed by a holy Conversation for the future, is an effectual Means to deliver us from this Shame. whatever our forepast Sins have been. For, they shall not be produced against us, they shall not be objected to us at that Day; they shall be buried in eternal Silence and Oblivion, and be as tho' they had not been. And this Opinion I hold, 1. More agreeable to the Scripture, which in this Matter makes use of the Terms of hiding, and covering, and blotting out, and forgetting. Psal. xxxii. 1. Blessed is the Man whose Transgression is forgiven, and whose Sin is covered. Isa. xliii. 25. I, even I am He, that blotteth out thy Trans-gressions, and will not remember thy Sins. So Pfal. 11. 9. Hide Thy Face from my Sins, and blos

blot out all mine Iniquities. Jerem. xlviii. 34. I will forgive their Iniquity, and remember their Sin no more. Ezek. xxviii. 22. All bis Transgressions that he bath committed, they shall not be mentioned unto him. Mic. vii. 19. Thou wilt cast all their Sins into the Depths of the Sea. And as it is more consonant to the Scripture, so is it, 2. More grateful and consolatory to the Penitents. For, the meer Mentioning and Reciting of their Sins before fuch an Assembly, must needs refresh their Shame and Sorrow, and so diminish their Happiness and Joy. To which I might add. that it is written, our Saviour at the last Judga ment, in pronouncing the Sentence, shall enumerate the Good Works of the Godly to their Praise; but not a Word said of producing their Sins. I fay, I hold this Opinion more probable upon these Accounts, than theirs, who affirm they shall then be published, for the magnifying and and advancing, the declaring and illustrating the Mercy and Grace of God, in pardoning fo great and heinous Offences.

And truly, I do not know, but that the Sins of the Blessed may be blotted out, even of their own Memories. Some Philosophers, who were of Opinion, that Souls præ-exist before their Bodies, thought they were dipt in Lethe, which is a Fountain causing Oblivion, by means whereof they forgot whatever they had done before. This I look upon as a Dream,

or Fancy: But, truly, I am inclinable sometimes to imagine, that the Soul of Man can hardly be entirely happy, unless it be as it were thus dipt in Lethe: For every sinful Action having a natural Turpitude in it, and being dishonourable, how can the Memory and Thought of it but beget such an ungrateful Passion as Shame, even to Eternity? And, what do Divines mean by saying, That the Action [of sinning] suddenly passes away, but the Stain and Blot of it remains; but that a vicious Action, even by them to whom it is pardoned, can never be thought of without Grief and Disturbance; it leaves an indelible Scar in the Soul, which can never be

perfected, healed, and obliterated.

2. It concerns us much to live in all holy Conversation in this World, as we desire to avoid that Pain and Misery, which we shall otherwise most certainly be adjudged to at that Day: That Indignation and Wrath, Tribulation and Anguish, which God shall render to them that do not obey the Truth, but obey Unrighteousness, Rom. ii. 8. That Worm that dieth not, and that Fire that is not quenched, Mark ix. 44. and 46, and 48. That outer Darkness, where is Weeping and Wailing, and Gnashing of Teeth, Matt. viii. 12. and xxii. 13. and xxv. 30. That Furnace of Fire, Matt. xiii. 42, 50. That Lake of Fire and Brimstone, Rev. xx. 10. or of Fire burning with Brimstone, Rev. xix. 20. Which Places, tho' they be

not literally to be expounded, yet do they import at least a very sad and deplorable Estate, a high Degree of Torment and Anguish: And all this Eternal, and without Intermission, Night and Day. These shall go into everlasting Punishment, Matth. xxv. 46. The State of the Damned is supposed to be a State of absolute and complete Misery, made up of the Loss of the greatest Good, and a constant, fresh, and lively Apprehension of it, which Divines call Pana Damni. And, 2. Excess of bodily Pain and Sufferings, and fad Distress and Trouble of Mind, occasioned by all manner of frightful Apprehensions, and vexatious Perturbations and Reflections, which they call Pana Sensus; and this without any Intermission or Hope of Deliverance eternally. Jude vii. it is called the Vengeance of eternal Fire. Rev. xiv. 11. The Smoke of their Torment is said to ascend up for ever and ever. And Rev. xx. 10. it is faid of the Beast and false Prophet, that they shall be tormented Night and Day for ever and ever. If this be so, is it not our greatest Wisdom to use our utmost Diligence and Endeavour to avoid so deplorable a Condition, and to secure to ourselves an Interest in a future Estate of everlasting Bliss and Happiness, when this Life shall be ended?

But here the Epicureans and sensual Perfons will be ready to object and argue, Here are Pleasures and Delights in this World,

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which are very inviting and taking, and do highly gratify my Senies and Appetites. I hear likewise of future Rewards and Punishments for those that deny or fulfill their Carnal Lusts and Desires. These sensual Pleasures I fee and taste, and feel, and am sure of, the other I do but only hear of, and therefore they do not, they cannot so strongly affect me: Were Heaven, and the Happiness thereof, set before my Eyes, and did I see it as plainly and clearly as I do these Things below, then indeed I should not need many Motives to provoke me to endeavour the Obtaining of it. But, alas! that is far above out of our Sight, the Joys of Heaven are by the Apostle termed Things not seen. Again, these outward and temporal Enjoyments are present and easily obtainable; the other at a great Distance, future, and besides, very hard to come by; and I love my Ease, Ut est ingenium bominum à labore proclive ad libidinem. Should I deny myself Good in this Life, and then perchance cease to be, and fo have no Reward for my Pains; nay, on the contrary, expose myself to the Hazard of many Afflictions and Sufferings; which are the Portion of the Godly in this Life, how unnecessarily shall I make myself miserable? Miserable I say, because by the Apostle's own Confession, Christians, if in this Life only they had Hope, would be of all Men the most miserable, i Cor. xv. 19. Had I

why have I these Appetites within me, and such Objects about me, the one being so suitable to the other, is it not more natural and reasonable to sulfill, than deny them? Surely, it cannot be Wisdom to lose a certain Good, for an uncertain Hope; and for an ungrounded Fear of Hell hereafter, to undergo a Purgatory here.

To this Argumentation upon the false Foundation of the Uncertainty of a suture Estate of endless Happiness or Misery, accordingly as we have behaved ourselves in this

Life, I answer,

THAT for the Futurity of such an Estate, we have the best Authority in the World, to wit, the Holy Scriptures, and universal Tradition.

to be more than humane, hath been by many so clearly and convincingly demonstrated, that I shall take it for granted, and not waste Time to prove it. The Testimonies herein contained, concerning eternal Happiness and Misery, are so clear and full, that it seems to me impossible, without manifest Distortion, to elude or evade the Force of them. Some we have already recited, and might produce many more, Isa. xxxiii. 14. Who among us shall dwell with everlasting Burnings? Dan. xii. 2. And many of them that sleep in F f 2

everlasting Life, and some to Shame and everlasting Contempt. 2 Thess. i. 9. Who shall be punished with everlasting Destruction from the Presence of the LORD, &c. speaking of them who know not God, and obey not the Gospel of our LORD JESUS CHRIST. Isai. Ixvi. 24. For their Worm shall not die, neither

shall their Fire be quenched.

THE Origenists, and others, that cannot be reconciled to the Catholick Doctrine of the Eternity of the Punishments of the Damned, make the Word alw, from which the Latin avum is derived, to fignify sometimes a determinate Time, as might (fay they) eafily be proved by many Examples, and so els alava, or alavas, which we translate for ever, fignifies, when applied to this Matter, a long indeed, but yet a finite Time; and eis Tes αλώνας των αλώνων, which we render for ever and ever, may likewise signify not an eternal Duration, but a Time to which some Term may be set by Goo, though to us unknown. In the same Sense they accept the Adjective ai úvios for a long, but finite Time. But I am of S. Augustin's Opinion, that aiúvios doth in the New Testament signify the same with aternus in Latin, and is appropriated to Things that have no End; and that είς τες αίωνας των αίωνων, for ever and ever, doth in like manner always denote eternal or endless Duration. That the Word al évios. when

when applied to the State of the Damned, doth fignify eternal, S. Augustin well demonstrates from the Antithesis in that Place of Matth. xxv. 46. And these shall go away into everlasting Punishment, but the Righteous into Life eternal. Where it is in the same Sense attributed to that Life which is the Reward of the Righteous, and that Fire which is the Punishment of the Damned; there being no Reason to believe that the same Word in the same Verse, when applied to Opposites, should be taken in a different Sense. But by the Consent of all Christians it is granted, that the Life of the Blessed shall be eternal, therefore so must the Punishment of the Damned be too.

THIS Acception of the Word aldinos for eternal or endless, when it referrs to the State of those miserable Persons, receives a farther

and strong Confirmation from the

SECOND Particular we proposed, that is, Universal Tradition: It being a received Opinion among the Heathen, which must needs descend down to them by Tradition from the Ancients, that Eternal Punishments awaited the Wicked after Death.

What more common Notion among the Grecians and Romans, than of an Elysium, and Tartarus? the former to reward good Men, the latter to punish wicked. And those too esteemed to be Eternal States. Of this the Epicurean Poet Lucretius is a suffi-

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cient

## Of the Dissolution

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cient and unexceptionable Witness: For he makes the Fear of these Punishments to be the Cause of all the Miseries of Humane Life, and the Foundation of all Religion.

Æternas quoniam pænas in morte timendum:

Now, that he could derive this from no other Source but Tradition, is clear; because he lived a good while before our Saviour's Time, and the Divulgation of the Scripture among the Heathen. And because it may be objected, that Æternas may signify only of long Continuance, to put the Matter out of all Doubt, in another Place he saith,

Action ----- Nam si nullum sinem esse putarent Erumnarum homines, nulla ratione valerent Relligionibus atque minis obsistere vatum.

AND that this Opinion and Belief generally prevailed among the People before Epicurus his Time, the same Lucretius testifies in the Beginning of his first Book,

Humana ante oculos fædè cum vita jaceret In terris oppressa gravi sub Relligione, &c. Primum Graius homo, &c.

Long time Men lay oppress'd with slavish Fear; Religion's Tyranny did domineer, Which being plac'd in Heav'n, look'd proudly down, And frighted abjest Spirits at her Frown. At last a mighty One of Greece began T'assert the Natural Liberty of Man, By sensless Terrors, and vain Fancy led To Slavery; streight the conquer'd Fantoms sled:

for he makes (as we saw before) the Fear of eternal Pain and Misery, to be the Founda-

tion of all Religion.

1. Now, because these Objectors do reprefent Religion to themselves and others as a melancholick and disconsolate Thing; and think and fay, that those that enter into this State, must bid adieu to all the Pleasures of Sense, and taste-no Sweetness in any worldly Object; I shall endeavour to remove this Prejudice. I say therefore, That our gracious God doth not envy us any real Good that the Creatures can afford us, and therefore hath not denied us a moderate Use and Fruition of any of them. And feeing He hath annexed Pleasure to those Actions that are necessary for the Support of Life, and Continuation of Kind, as a Bait to invite us to the Performance of them, it seems to me highly absurd and contradictious to affirm, that He hath forbidden us to partake or taste those Enjoyments which Himself has appointed as effectual Means for the Security of those great Ends; and which are so necessary Consequents of those Actions, that we cannot but partake them. Where the Appetite is eager, God hath indulged, I might fay, commanded Ff4

a moderate and regular Satisfaction. And we know, nay, the Blindness of Atheism cannot deny, that the greatest Pleasure results from a moderate and well circumstantiated Use of Pleasures. Voluptates commendat rarior usus. Now a religious Man enjoys all the Pleasures of these worldly and sensible Goods, without any of the Pain which is annexed to the exceffive and irregular Use, or indeed Abuse of them: And besides, his Pleasure is enhanced, in that he beholds and receives them as Blessings of God, and Tokens of His Favour and Affection, and is without all Fear of a future fad Reckoning for his Participation of them. Howbeit a Denial of ourselves for God's Sake and Cause, in any thing which we might otherwise lawfully enjoy, though it be not commanded, yet is accepted, and shall be rewarded by Him.

OTHERS there are who grant, That these Words grammatically signify as we contend, and that eternal Punishments are indeed threatned to the Wicked; but say they, these Threatnings are intended only as Terriculamenta, or Bug-bears to Children, to terrify and keep People in Awe, and to preserve the World in some tolerable Condition of Quietness. And Origen himself, tho' he be of Opinion, that these Threatnings signify only temporary Pains; yet he saith, that such Mysteries are to be sealed up and concealed from the Yulgar, lest wicked Men should

rush into Sin with all Fury and Licentiousness, if this Bridle were taken off, who by the Opinion and Fear of eternal and endless Punishments can scarce be deterred and restrained from it.

To this I answer, 1. That it seems to me indecorous and unsuitable to the Person and Majesty of God, to make use of such forry and weak Means to bring about his Ends, as grave Men can hardly condescend to. 2. I do not see how it can consist with his Veracity, in plain Terms absolutely to threaten and affirm what he never intends to do.

INDEED it is questionable, Whether it be allowable in Man; it being at best but an officious Lye; for it is a speaking what we do not think, and that with an Intention to deceive.

Secondly, I proceed now to a fecond Objection against the Eternity of the Pains and Sufferings of the Damned, and that is, its Inconsistency with the Justice of God. What Proportion can there be between a transient and temporary Act, and an eternal Punishment? The most rigid Justice can exact no more than a Talio, to suffer as I have done.

"Εικε πάθοι τὰ κ' ἔρεξε δίκη δ' ὶθεῖα γενοίτο.

If I have hurt, or grieved, or injured any Man, to be punished with the same, or an equivalent Suffering: If I have taken any unrea-

unreasonable Pleasure, to compensate it with an answerable Pain. Indeed, the Enormities of my Life cannot well deserve so much, if it be considered, that I have been strongly instigated and inclined, and as it were fatally driven upon all the Evils which I have committed, by those Affections and Appetites, which I made not for myself, but found in myself; and have been exposed to strong and almost inexpugnable Temptations from without; beset with Snares, encompassed about with innumerable Evils.

To this I answer, First, that every Sin, Injury, or Offence, is aggravated and enhanced by the Dignity or Merit of the Person against whom it is committed. So Parricide is esteemed a greater Crime than ordinary Murder, and by the Laws of all Nations avenged with a forer Punishment. The like may be said of Læsa Majestas, or Treason. Now God is an infinite Person, and Sin being an Injury and Affront to Him, as being a Violation of His Law, an infinite Punishment must be due to it.

THIS Answer Dr. Hammond in his Practical Catechism, lib. 5. sect. 4. accounts a Nicety, and Unsatisfactory, as also that other common Answer, That if we should live infinirely, we would fin infinitely; and therefore gives us another, which in his Discourse of the Reasonableness of Christian Religion,

he thus briefly sums up.

2. That

2. That the Choice being referred to us to take of the two which we best like, eternal Death set before us on the one hand, to make eternal Life the more infinitely reasonable for us to choose on the other hand, and the eternal Hell (whensoever we fall into it) being per-fecty our own Act, neither forced on us by any absolute Decree of God, nor irresistible Temptation of the Devil or our own Flesh; but as truly our Wish and Choice, and mad Purchase, nay, much more truly and properly, than eternal Heaven is, (when our Obedience is first wrought by Go D's Grace, and yet after that so abundantly rewarded by the Doner) it is certain, if there be any thing irrational, it is in us unkind and perverse Creatures (so obstinate to choose what God so so passionately warns us to take heed of; so wilfully to die, when God swears He wills not our Death) and not in Him, who hath done all that is imaginable to be done to reasonable Creatures (here in their Way or Course) to the Rescuing or Saving of 215-

Bur to this may be replied, If the Thing itself be unjust, how can our Choosing of it make it just? Now, that it is unjust, appears, in that there is no Proportion between the Offence and the Penalty, that is, between a short and transfent Act, and an eternal Punishment.

To which I answer, That God deals with us as with intelligent Creatures, and

that have Liberty of Will; and so are to be led by Motives to choose that which is good, and refuse that which is evil: And therefore, though there should be no Proportion between them, (as in the first Answer we have shewn there is) yet the Annexing such a Punishment to the Violation of His Laws may be just, because a lesser would not be a fufficient Motive to determine our Choice, and fecure Obedience to them. As we fee Lawgivers, in the Sanction of their Laws, are not so solicitous to make the Penalty commensurate to the Offence in Point of Duration, as that it be sufficient to enforce Obedience to the Law; not thinking it unjust to annex a Punishment much longer than the Offence, if a lesser will not serve to secure Obedience. So several other Crimes besides Murder are punished with Death, which is a kind of eternal Punishment, there being no Return to Life again: And those Laws only are unjust upon account of disproportionate Punishments, where leffer would serve the Turn.

Now, that lesser than eternal Punishments would not suffice to enforce Obedience to God's Commandments, is clear in Experience: And Origen himself, the first Broacher of the Opinion of the Determination of the Damneds Punishments, could not but confess it, in that he saith, It is to be held as a great Secret, and carefully concealed from

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the Knowledge of the Common People, who, if you take off this Bridle, would be apt to rush into Sin, as a Horse rusheth into the Battle. Indeed Eternity is the very Sting of Hell. Bate him but that, and the Sinner will not think it very terrible or insupportable. But the Thought of an eternal Hell intervening, (and it will often intrude itself) strikes a cold Damp to his very Heart, in the midst of all his Jollities, and will much qualify and allay all his Pleasures and Enjoyments. Rid him of this Fear, and he will be apt to despise Hell and all his Torments, be they never fo grievous or lasting. He will be ready thereupon thus to argue with himself: What need I take so much Pains to strive against Sin? What need I swim against the Stream, stem the Tide of my Passions, my natural Appetites and Inclinations, and relist the Importunities of Company? What need I keep such a constant Watch and Ward against my spiritual Enemies the Devil, the World, and the Flesh? If I fall into Hell at last, that's no eternal State, it lasteth but for a time, and will come to an End. I'll venture it, I hope I shall make a Shift to rub through as well as others.

This, therefore, I think is the most solid and satisfactory Answer to that grand Objection against the Justice of God in punishing a short and temporary Offence with eternal eternal Pains and Sufferings, because lesser are not sufficient to enforce Obedience to His Laws.

IF any Man be distatisfied with the precedent Answers, all that I have to add farther, is, that before this Sentence adjudging to eternal Death be pronounced against him, and executed upon him, there shall be such a Revelation made, as shall convince and satisfy him of the Righteousness thereof. And this the Apostle seems to intimate, Rom. ii. 5. when he calls the Great Day of Doom, the Day of the Revelation of the righteous Judgment of God. Then shall be made appear what now to our dim-sighted Reason is not penetrable; how the Justice of God can consist with the eternal Damnation of the Wicked.

As for Man's being as it were fatally determined to Evil by the Strength of Temptation, and the Violence of unruly and head-firong Passions and Appetites: I answer, That there are Motives and Considerations sufficient to enable a Man to resist and repell, to conquer and overcome the most alluring and fascinating Temptations, the most urging and importunate Appetites or Assections; such are, certain Shame and Disgrace, and that not long to come, eternal Insamy and Dishonour; present Death, strong Fear and Dread of approaching Death, or sad and intolerable Pains or Calamities. Now

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the Divine Threatnings are of the greatest and most formidable Evils and Miseries that humane Nature is capable of suffering; and therefore were they but firmly believed and apprehended, they would be of Force sufficient to stir up in us such strong Passions of Fear and Terror, as would easily chase away all Temptations, and embitter all the Baits of sensual Pleasure.

3. THERE remains yet a third Objection

against an eternal Hell, and that is, that it is inconfistent with the Divine Goodness. For the Unbeliever will fay, It's contrary to all the Notions and Ideas I have of God, to conceive Him to be fo angry and furious a Being. How can it stand with Infinite Goodness, to make a Creature that he fore-knew would be eternally miserable? We Men account it a Piece of Goodness to pardon Offences: And all Punishments are intended either for the Reformation and Amendment of the Offender, or, if he be unreclaimable, to prevent the Mischief which he might otherwise do, or for an Example to others to deterr them from the like Enormities; but I do not see for what fuch End any Man can be eternally tormented. So that of such Inflictions one may

comes of them? How then can they come from GoD, who by all Mens Confession is

infinitely Good?

To

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To which I answer: First, That God is just as well as good. You will say, What is Justice? It is an equal Weighing of Actions, and Rendring to every one his Right or Due: A Setting streight again what was perverted by the Sins and Extravagancies of Men. Now, that the Breaking of Order and Equality in the World, this Usurping and Encroaching upon others Rights, is a great Evil, and ought to be rectified, some may take an Argument from the strong Inclination and Defire to revenge Injuries, that is implanted in the Nature of Man, and of all Creatures. You'll fay, all Defire of Revenge is absolutely finful and unlawful. I answer, I am no Patron of Revenge. I know, the very Heathen, by the Light of Nature, condemned it.

---- Insirmi est animi exiguique voluptas, Ultio ----

Revenge is the Pleasure of a poor and weak Spirit. Yet, let us hear what they have to say. 1. It is hard to affirm, that any innate Appetite or Desire is in itself simply and absolutely, and in all Circumstances whatsoever, unlawful; for this seems to restect upon the Author of Nature.

To which may be answered, that a well circumstantiated Desire of Revenge may not be in itself unlawful, yet for the evil Confequents of it, it may be, and is prohibited by a positive Law. 2. Divine Persons have prayed

prayed to God to avenge them, as David and the Prophets. And S. Paul himself, 2 Tim. iv. 14. prays GOD to reward Alexander the Coppersmith according to his Works. To which may be answered, That those Expressions are rather Predictions of what should befall their Enemies, than Desires that they might. Again, whereas it is faid, Rev. vi. 9, 10. That the Souls of them, under the Altar, that were flain for the Word of God, and the Testimony which they held, cried with a loud Voice, saying, How long, O Lord, Holy and True, dost Thou not judge and avenge our Blood on them that dwell on the Earth? Dr. Hammond saith, It signifies no more, than that their Blood cries to God for Vengeance, as Abel's is faid to do. 3. The Nature of Forgiveness feems to imply the Lawfulness of some Desire of Revenge. For what is Forgiveness, but a Parting with, and a Renouncing the Right I have to be Avenged; and, therefore, before I Forgive, I do retain at least some Will to be Revenged. And, I am not obliged by our Saviour, to Forgive absolutely, but upon Condition of Repentance. Luke xvii. 3, 4. If thy Brother fin against thee, rebuke him; and if he repent, forgive him, &c. And in the Lord's Prayer, one Petition is, Forgive us our Trefpasses, as we forgive them that trespass against us. But God forgives not without Repentance. To which may be answered, That before Gg

before his Repentance, I may retain a Will of having an Offender punished by the Magi-strate, or by God, for his own Good and Reformation, but with no respect of avengeing what is past. And if his Repentance prevents his Punishment, then I am to forgive him, that is, cease to desire his Punishment. But all allow Vengeance to be just in God, whose Actions are not to be scanned by our Measures. He hath not permitted Vengeance to us, but hath reserved it to Himself. Vengeance is Mine, (saith the

LORD) and I will repay.

2. If it be just with God to propose to us fuch a Choice as Heaven, upon Condition of our Obedience to His Law, or Hell in case of Disobedience, as, we see, some wise Men make no Scruple to grant; then it cannot be Injustice in Him to inslict the Punishments of Hell upon them that make it their Choice. Nay, I cannot see how it can consist with His Veracity not to do it: Why then should any Argument from His Goodness move us to distrust His Veracity? as I have before intimated. It may also be answered to the Demand, Cui bono? That these eternal Punishments were threatned for a very great Good, viz. to secure Obedience to the Divine Laws, and to restrain Men from sinning.

IT may be objected against the Goodness of GoD, and His Philanthropy, or Love to

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Mankind, How can it consist therewith, to permit Sin to enter into the World? Why did He not prevent it, and make it imposfible it should enter, since He hath Wisdom enough, and Power enough, to prevent it? that I may use Dr. Whichcot's Words, [Ser-

mons, Vol. II. Serm. V.]

To which I answer; Why might not God make a Creature, endued with a Faculty of Understanding, to discern that which is Good, and Freedom of Will to make Choice of it, and under no Necessity of Sinning? If He may, and hath made fuch an one, it doth necessarily follow, unless He frustrates His own Workmanship, that He must suffer it to act according to its own Will. Indeed, without this Freedom of Choice, there can be no fuch thing as Vertue or Vice. For, how can that be a vertuous Action to which the Agent is as necessarily determined, as a Stone to fall downward.

But farther to vindicate the Honour of our Maker, (saith the forementioned Dr. Whichcot) and to put all out of Doubt, all those things considered which are the Provision of God, Man is more sufficient to His Effect, and the Purposes of His Creation, than any other Creature whatfoever. For as that to which a Man is called and required, is of a higher Nature than that of any other Creature below him; so also are his Principles higher and nobler; and there is over

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and above these, the Assistance of Grace, which is supernatural, and more than is due to him. This is such an Assistance as is able to raise a Man to that which is supernatural, and to fit him for the State of Glory. You see, inferiour Nature is sufficient to its End, and hath not failed, and we are consident that it will not fail. Now, why a Man that is invested with nobler Principles should not act at a higher rate, according to those Principles and Endowments, is a thing not to be answered. But to return from whence I

have digressed.

I AM as unwilling as any Man to limit the Mercies of God, because I have as much need of them as any Man: Yet I must referr it to Him, whether He will be more savourable than He hath threatned, or no, whether He will remit something of the Severity of His Comminations. I am also willing to restrain and confine the Sense of these Words, αίωνες, and αίωνες αίωνων, as far as the Context will permit. But let our Opinions and Hopes of the Mercies of God, and temporary Hell, I say, or rather a Purgatory, instead of Hell: For the Word Hell, according to the usual Acception of it, includes Eternity.

I SHALL add farther, That since God hath threatned eternal Punishments, and it is no Injustice in Him to inslict them upon

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the Breakers of His Laws; and, since we can scarce reconcile it with His Veracity not to do so, it is our wisest and safest Course to believe them. For, though He should not intend to execute the Severity of them upon us, as we may groundlesly imagine; yet it is clear, that He would have them be believed by us, else they cannot have that End and Effect He designed them to: And, therefore, it must be Unbelief and Presumption in us to deny or distrust them, tho' upon Supposition, that they are irreconcilable with His Goodness; with which, yet, perhaps, they may accord well enough, tho' we cannot at present discern it. All Divine Revelations are to be believed and accepted by us, as well Threatnings as Promises; and, if we may distrust the Veracity of God in Them, I know not but we may as well do it in These: If we deny the Eternity of the Torments of Hell, I do not see but that we may, upon as good grounds, with Origen, deny the Eternity of the Joys of Heaven.

LET not then the Presumption of a temporary Hell encourage thee to go on in Sin a For, how if thou shouldst find thyself mistaken? If the Event frustrate thy Hopes, and fall out contrary to thy Expectation, as it is most likely it will, What a sad Case wilt thou be in then? How will the Unexpectedness thereof double thy Misery? Im-

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provisa gravius feriunt. How wilt thou be firicken, as it were, with a Thunderbolt, when the Almighty Judge shall fulminate against thee a dreadful indeed, but by thee formerly undreaded, Sentence, adjudging thee to endless Punishments? How wilt thou damn thine own Credulity, who by a groundless Belief of a temporary Hell, hast precipitated thyself into an eternal, which otherwise thou mightest possibly have avoided?

Well, but suppose there be some Shadow of Hope of the Determination of the Punishments of the Damned; it is by all acknowledged to be a great Piece of Folly, to leave Matters of the highest Moment, and which most nearly concern us, at Uncertainties; and a Point of Wisdom, to secure the Main Chance, and to be provided against the worst that can come. An eternal Heaven, or State of complete Happiness, is the Main Chance, and is not to come into any Competition, or fo much as to be put into the Balance against a few short, transient, fordid, loathed, and, for the most part, upon their own account, repented Pleasures: To secure to ourselves an Interest in such a State, is our greatest Wisdom. And as for being provided against the worst that may or can come; What can be worse than an eternal Hell? Which there is, I do not

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fay a Possibility, but the greatest Probability imaginable, that it will be our Portion, if we persist in Impenitency, and die in our Sins. But suppose the best should happen that we can hope or conceive, that Hell should last only els alwas alwww, for Ages of Ages, and at last determine: Do we think this a small Matter? If we do, it is for Want of Consideration and Experience of Acute Pains. Should any of us be under the Sense and Suffering of a raging Paroxysm of the Stone, or Gout, or Colick, I doubt not but rather than endure it for Ten thousand Years, he would willingly part with all his Expectation of a Bleffed Estate after that Term were expired, yea, and his Being to boot. But, what are any of these Pains to the Torments and Perpesfions of Hell? or, the Duration of Ten thousand Years to those Ages of Ages? If thou makest light of all this, and nothing can restrain thee from Sin, but the Eternity of Punishment, thou art bound to thank God, who hath used this only effectual Means, threatning an eternal Hell. And it ill becomes thee to complain of His Rigour and Severity, who wouldst have made so pernicious an Use of His Lenity and Goodness. But thou who hast entertained fuch an Opinion, and abused it, to encourage thyself to go on in thy Sins, though others

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others should escape with a temporary Punishment, surely thou hast no Reason to expect any milder Doom than to be sentenced to an eternal.



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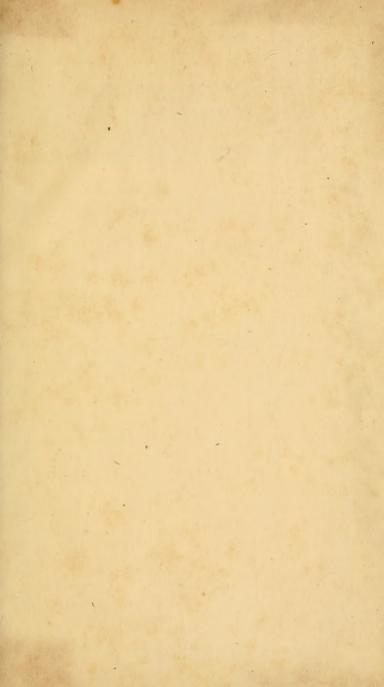
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